

MOTOR AGE

MARCH 20, 1913

Motor Clothing for 1913

Sweden's Winter Reliability

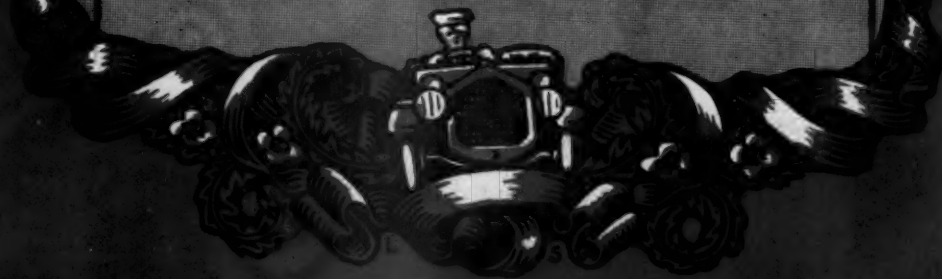
Foreigners Prepare for
American Racing Invasion

Motor Matters Before Legis-
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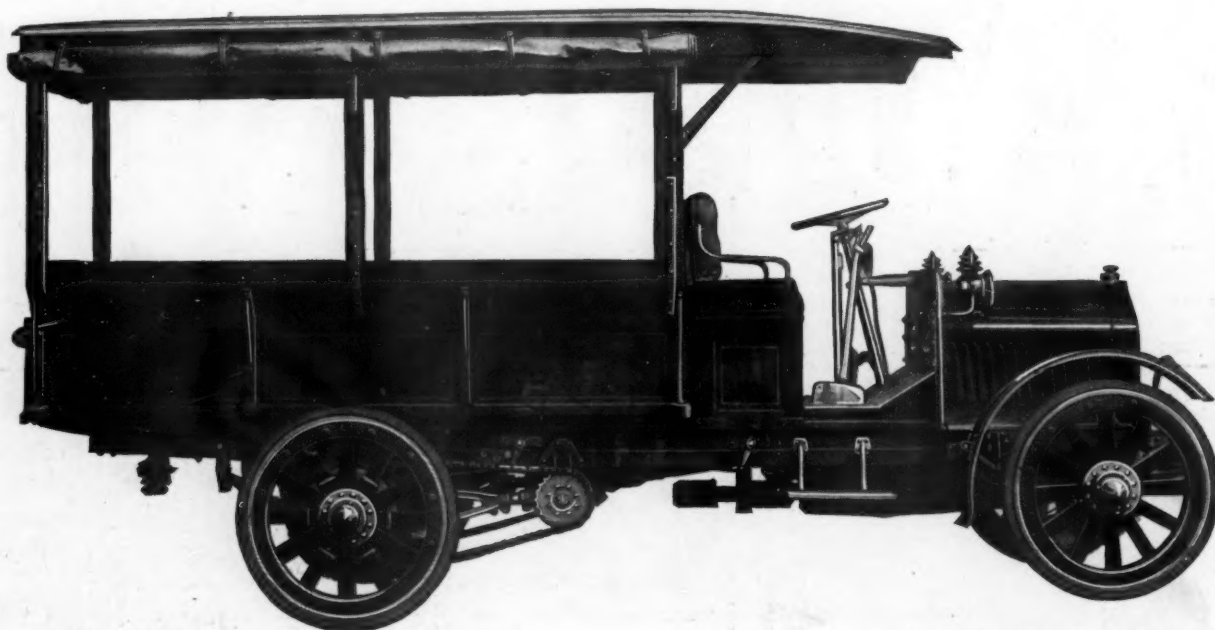
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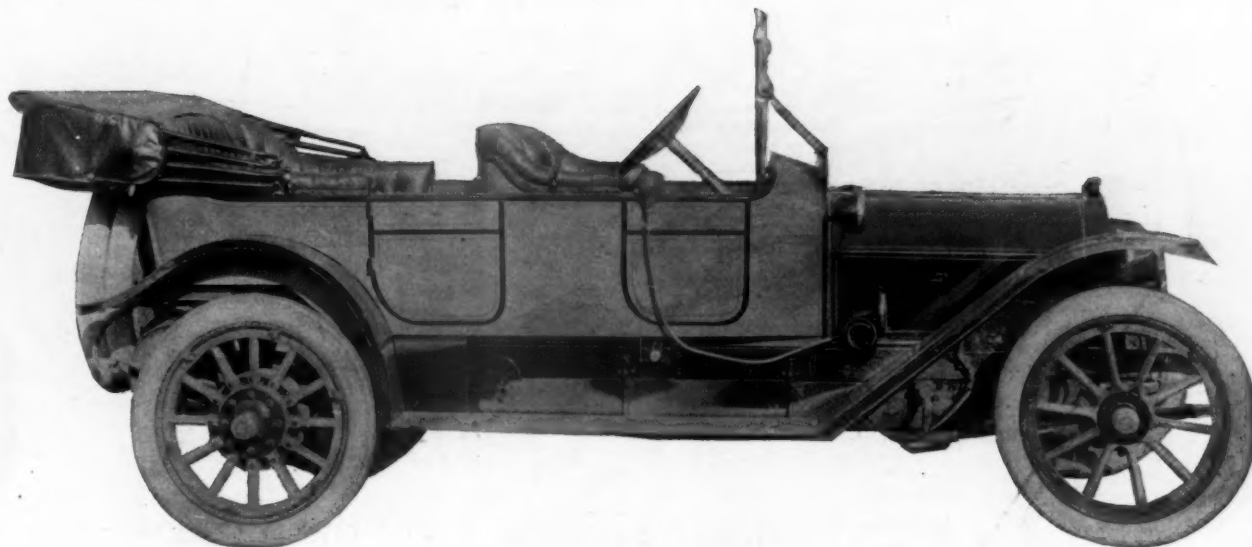
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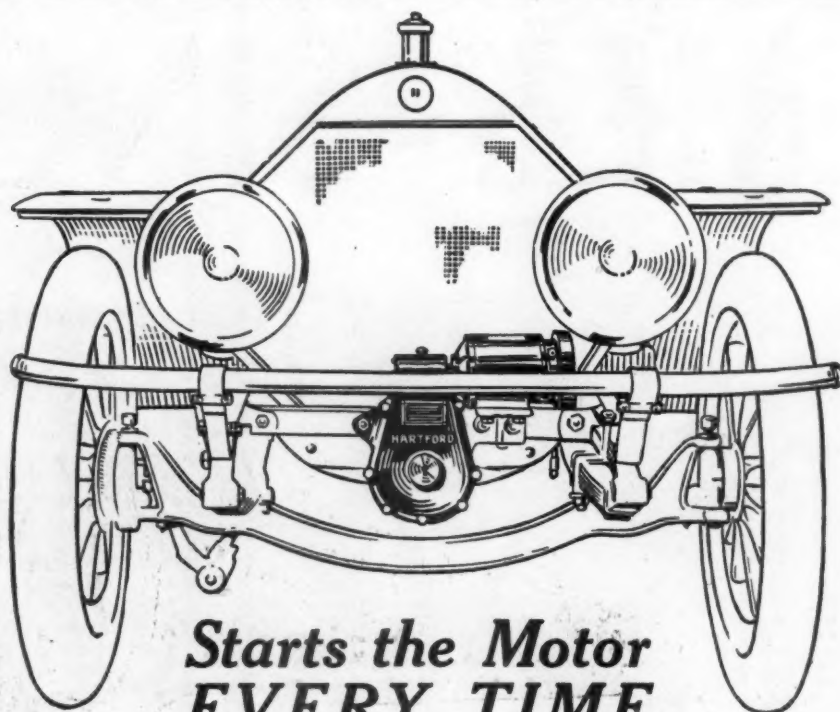
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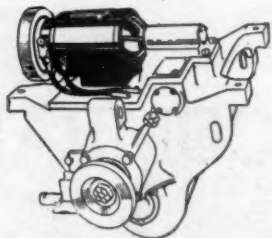
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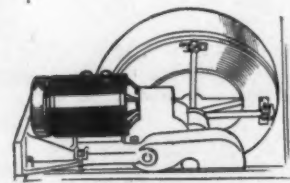
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MOTOR AGE

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All Acknowledge the Necessity of Weed Chains

In one of those friendly after-lunch-eon, get-together parties at a well known city club, eleven men drifted on to the subject of the dangers of skidding. With a single exception each of the eleven owned an automobile, and each had a skidding experience to relate, and each felt that his particular predicament was the most sensational and startling.

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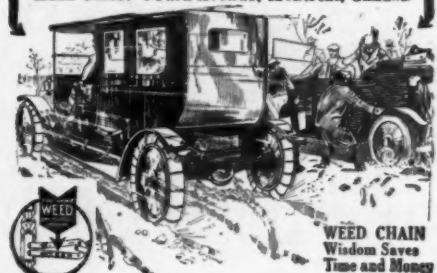
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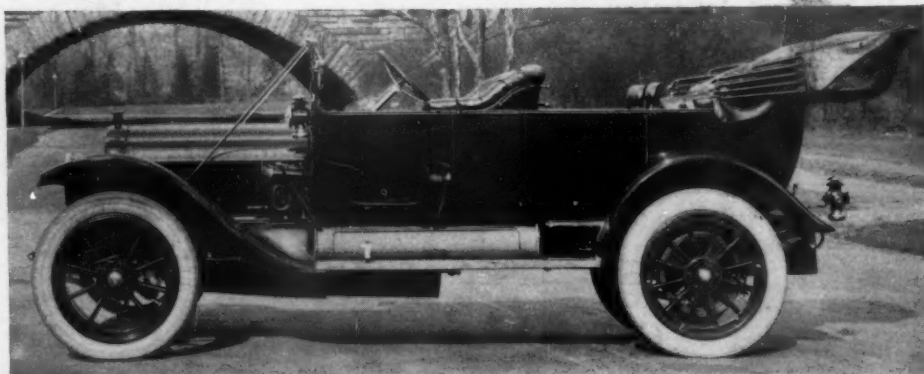
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Easter Ushers in New Motor Fashions

By J.C. Burton

FASHION, most dictatorial of all arbiters, now claims the motorist as her own. After her formal coronation next Sunday, Easter day, she will be supreme. On city boulevard and rural highway thousands of her gay subjects will drive and pay her homage in a polychromatic review. Although bare trees and brown pastures still await the magic touch of Mother Nature, arch procrastinator, the motorist is preparing for Fashion's annual festival.

Motor Toggery Now Pertinent

The "what shall I wear?" question has replaced the "what shall I drive?" interrogation in the mind of the man or woman who has heard the faint but seductive call of the road. When the congealing blasts from Medicine Hat were on their annual rampage, discussion of new models was all very well and the motor shows were most inviting, but who wants to investigate torsion tubes and worm gears when the fragrant breath of spring is in the air and fascinating shop windows demand immediate attention? Prosaic mechanics and the blooming crocus have nothing in common. Therefore the looking glass, instead of the table of specifications, is sought.

It is time to lay aside the coat of many colors. Had Joseph been a motorist, he could not have resisted the temptation to discard his flamboyant mackinaw for one of the smarter and less vociferous garments shown by the traveling merchant of his time. The fur coat also is passe, except in the arctic and antarctic zones where the isolated Eskimo must joy-ride on

a crude sled instead of in a modern vehicle propelled by gasoline.

What shall displace the mackinaw and fur coat?

Fashion answers that question, and not arbitrarily either. The obliging members of her retinue, in the exclusive shops of the large cities, will place before you such a variety of beautiful and comfortable garments that you will be nonplussed in making a selection. There are coats of homespun in which the Irish peasants seem to have woven their warmth of heart; coats of tweed and worsted that give the democratic Yankee the swagger of the aristocratic Briton; hats and bonnets, gay creations of straw and silk with yards of billowy veiling and fashioned by the artistic hand of the French milliner, for the woman who motors.

Fashions for Spring Wear

Fashion arbiters know the fickleness of spring and in designing garments for this year have attempted to balk the Carmen of the seasons. They have selected fabrics of the minimum weight—almost as light as the proverbial feather—but insuring the wearer the maximum warmth when the piercing winds of March blow and warm April skies suddenly turn dark and cold. Like the manufacturer of motor cars, the maker of motor apparel has given the utmost consideration to service and comfort, but not at the expense of style.

Take the change in the duster, the most popular garment ever adopted by the motorist, as an example of the maker's attempt to combine service and style. Two years ago when it came into almost universal favor as a coat for summer touring and a protection against microscopic particles of highway and landscape, it gave the wearer anything but an air of distinction. Made of linen the color of wrapping paper, and with no pretensions of fitting, it smacked of the Sunday pilgrimage, behind patient, plodding old Dobbin, to the cross roads church. A party of motorists, clad in dusters and walking up the main street of a small town, might easily be mistaken for the members of the "Si Perkins" theatrical troupe on parade.

Metamorphosis of the Duster

But the duster no longer is a part of a masquerade costume to be worn with brush whiskers and hay-field hat. It has undergone a much-desired metamorphosis in the hands of the designer and is now a strictly motoring garment. Made of homespun linen in a variety of neutral shades that do not show the dirt and in black and white mixtures, it has raglan shoulders, close-fitting military collar, wide cuffs and a decided sweep at the bottom and fastens with large pearl buttons. It is just as serviceable as ever and as distinctive as a woolen coat four or five times as expensive.

For touring in the early spring, when the mercury in the thermometer is inclined to volplane toward the freezing mark, there is the English wheel coat, a garment of



A toque of red hemp braid and facing of flowered ratine with green veil, shown by Marshall Field & Co. of Chicago



Silk touring cap of black and white checkered silk with Copenhagen blue facing and bow, shown by Marshall Field & Co., of Chicago

many pleats and expansive skirt that is a decided improvement over the ulster of the yesteryear. The cutter was anything but stingy in his use of goods in making this coat. It measures 5 yards around the bottom and when spread out covers almost as much ground as the "big top" P. T. Barnum loaded on the wagon that bore the equipment of his first tent show. Although it might be termed a freak garment, the wheel coat appeals to the discriminating motorist who demands both style and comfort. It is a guarantee of warmth. The skirt can be wrapped around the limbs two or three times and defies the most ambitious winds. The coat also may be used as a robe.

Wheel Coat Something New

The wheel coat is made of tweed and has a military collar, slash pockets and kimono sleeves, permitting freedom of arm movement in driving or making repairs and engine adjustments.

The most radical of all spring garments, the wheel coat has many imitators in the more conservative models. The skirt with a wide sweep is the rule, rather than the exception, this season. It is a wise adaptation of an English pattern since it affords comfort to the wearer not only while seated in the car but on entering or leaving the machine, as it permits an unhampered step. The bell-shaped coat is destined to be a popular model as it is both serviceable and stylish.

Among the new fabrics that will claim first attention of the motorist are the knitted goods—the Tyrolean, Miagora, expanding tweeds and stockenette cloth. Like the skin of the India rubber man of the side show and dime museum, the knitted coats can be pulled and stretched without fear of injury. They spring back into shape with pleasing elasticity. They never require pressing, being immune from the wrinkles to which the worsteds and chevots are ever heir. They are rain-proof as well as wrinkle-proof and besides the freedom of movement which a garment

of this kind affords, combine warmth and light weight. The knitted coat is a decided innovation and the ideal garment for early spring wear. Being of knee length,



A smart tan duster of English army cravenetted worsted. This garment, from The Hub, Chicago, has a belted back, patch pockets and a bell bottom with a sweep of 86 inches



English touring coat of broken black and white check tweed with large convertible storm collar and broad revers. The garment falls straight from the shoulders in back and has a commodious drop arm and diagonal pockets. It is lined with Nell rose silk. The hat is styled the Soudan model. It is helmet-shaped and made of either black velvet or black satin with a detachable white veil. Both coat and hat are shown by Marshall Field & Co., of Chicago

it is as good style for promenading as for touring.

Motor Coat Has Broad Meaning

In fact, the phrase "motor coat" now covers a multitude of garments. The motor coat is no longer cut like an acolyte's robe, a flowing vestment synonymous with gasoline and blowouts and unsuitable for street wear. Today the motorist can walk home without advertising by his apparel the distressing fact that his car is stalled in the mud 3 miles back. Three-quarter length coats, differing but slightly from the model worn by the dapper boulevardier, are shown by clerks in the exclusive



An ulster of imported black and white tweed which is very popular with the patrons of Marshall Field & Co., Chicago. The coat has kimono sleeves, large patch pockets, deep cuffs; fastens high at the neck, and is lined with emerald green silk. The hat shown in this picture, also from Marshall Field & Co., is an imported English tri-corner shape of cerise hemp braid, caught up at the sides with embroidered Oriental trimming and draped with a green veil.

shops to the man who rides in the tonneau with a hired chauffeur at the wheel of his car. The very newest coat of this kind is of covert cloth with lapel collar and belted back. It is an especially smart recruit for the Easter parade whether the wearer walks or rides.

Offerings in Gabardine

Gabardine will ever be a popular cloth with the motorist, especially favored in the spring when winds are raw and nimbus clouds of conflicting temperaments clash unexpectedly. This year's gabardine coats seem more serviceable than the garments



The close-fitting Mercury hat shown by Marshall Field & Co., Chicago. It is made of red hair braid with piping of black and white straw and white wings.



A rubberized cap of ecru silk with green-lined visor and detachable veil. From the millinery department of Marshall Field & Co., Chicago.

of previous seasons. They are cut on more distinctive lines and have the large sleeve and commodious arm hole which make for the maximum comfort.

There is one reversible coat on the mar-



The English wheel coat, imported by Capper & Capper of Chicago, is a garment for the ultra-fashionable motorist. It is made of dark grey tweed and has a skirt measuring 6 yards around the bottom, kimono sleeves, close-fitting military collar and slash pockets.

ket that should have a particular appeal to the motorist who demands a practical garment. It is made of brown Donegal homespun on one side and of tan gabardine on the other. When skies are blue but the sun is lacking in intensity, the homespun safeguards the wearer against chills. When lightnings flash and thunder roars, the gabardine protects the unfortunate driver from the pelting rain. This coat is double-breasted and has a Prussian collar and a large sweep to the skirt. It is an excellent emergency garment.

Inter-liner Makes Its Debut

Another innovation in motoring apparel that might be classed as standard equipment for the tonneau of any car is the inter-liner, a sleeveless touring toga that will be appreciated by the provident owner when there is a decided drop in the temperature. Made of a light weight knitted cloth, it fits the body closely and is neither bulky nor cumbersome when worn under a top coat. The inter-liner will serve as an invincible armament against the attack of the pneumonia and bronchitis bacilli.

After being couchant for several seasons, the homespun is again rampant. It is a fabric of fascinating warp and woof; it seems as sturdy as the hardy peasants who wove it, as soft as the fleece of the sheep that were shorn of their wool that the motorist might be warm. It is as practical as it is appealing. It shows few stains of travel. It may collect the dust but makes no open confession of so doing. The motorist seeking an exclusive fabric had best jilt the alluring homespun. A coat of that textile promises to be as common as the business suit of shepherd plaid.

Excepting the so-called top coats, the majority of the motoring garments for men are said to be waterproof. Whether they will stand the H₂O test is a matter for individual investigation. Sporadic showers in April probably will make little impression on them, but a healthy thunderstorm may convince the wearer that a salesman is not to be taken too seriously. Although there are a number of substitute



fabrics on the market, none has proven as reliable as gabardine cloth and even that has been found wanting at times. The motorist desiring an absolutely waterproof coat should swallow his pride and invest in an oilskin slicker. He may have to suffer the humiliation of being mistaken for a living advertisement of a well-known biscuit but his under garments will be dry at the end of an inundated tour.

Following English Ideas

There is little decided difference between the imported and domestic garments. The former are more extreme than the home product, as the English wheel coat, but the majority of the American coats apparently have been patterned after foreign models. Conservative adaptation has been the aim of the Yankee designer. The full skirt, belted back and patch pockets, all of British origin, are decidedly the vogue. These features add a tone to the 1913 models which the garments of previous seasons lacked.

The fabrics are almost all imported, the homespun from Scotland and Ireland; the tweeds, worsteds and cheviots from English mills. Mixtures of black and white and innumerable shades of brown and gray are the prevailing colors. There are no clashing hues to blind the beholder as was the case when the blatant mackinaw made its noisy debut. Not that the fabrics are puritanical. They are anything but that. There are lines and dots of bright red, yellow and green in the gray and brown cloth, but they are subdued and make for

From left to right—The first illustration is another coat shown by Marshall Field & Co., Chicago. It is made of striped black and white tweed and fastens with large white pearl buttons and loops of black silk braid. It has the full kimono shoulder and at the bottom of the front of the coat, the material runs on the bias and forms a deep fold. The cuffs and collar, which is convertible, are trimmed with cotton rat-tine. The garment is lined with Copenhagen blue silk. The hat in this illustration is a close-fitting English importation of red hemp braid with rolling brim and tam-o-shanter crown and finished with a broad band of Oriental silk and draped with a red veil.

The second shows a loose, comfortable coat of dark tan wool ottoman, lined with Persian silk and fastened with three buttons below and one at the collar. The garment is slightly cutaway at the bottom in front and has a deep yoke effect in the back. A purple poke bonnet, with hemp braid brim and crown of oriental chiffon, harmonizes well with this coat. The hat is draped with a purple veil piped with oriental chiffon. Both are to be found at Marshall Field & Co., Chicago.

The third and fourth illustrations are front and back views of a coat of gray worsted mixture trimmed with Copenhagen blue brochea eponge. The garment has a convertible collar, small fancy leather belt in back and cutaway front and is trimmed with glass buttons. It is lined with Copenhagen blue silk. The hat shown is a draped turban of Copenhagen blue satin with aeroplane bow in back and appliqued with yellow rose clusters. Models from Marshall Field & Co., Chicago.

a harmony rather than a discord of color.

The norfolk jacket still is the accepted coat for the motorist. If it ever goes out of favor it will be because the chauffeur

has made it his trademark. Merchants have ceased to carry a large stock of chauffeur uniforms because the man who drives a car for hire objects strenuously to brass buttons, knickers and puttees. Ninety-nine out of every hundred select a norfolk suit.

To avoid any mistaken identity a distinctive norfolk has been designed for the car owner. Its price is almost prohibitive as far as the chauffeur is concerned, and its cut so extreme that none but a man of means could wear it properly. The jacket is one of many pleats, expansive patch pockets and extra long—a strictly English garment of a luxuriant tweed. The purchaser has his choice of long trousers or knickerbockers, but generally selects the latter, as he buys the suit for touring and on a long trip the knickers are more practical.

Headgear for the Motorist

The 1913 motoring cap, by any other name, would be unbecoming. The old order changeth not. The gabardine creation still smacks of the second-story worker and jimmy expert and the expansive covering of plaid cloth harkens back to school days. But if a cap must be worn, purchase one of black and white check. It is the dernier cri in spring headgear for the less dangerous of the species.

Neither is there any decided innovation in motor gloves. The gauntlet of tan goat-skin or gray suede is favored by the twentieth-century cavalier who drives his own car, while the chamois glove is popular with the owner who lounges back in the tonneau and gives directions to the chauffeur. There also is a chamois skin gauntlet shown at some of the exclusive shops that should prove most practical, as it is soft and warm and can be cleaned easily. There is not as great demand for gaunt-

lets this year as in seasons past, probably because they are regarded as part of a chauffeur's uniform.

Unlike the makers of coats, suits, caps and gloves, the cordwainers have yet to specialize on a motoring shoe for spring and summer use. Several serviceable boots for winter touring have been put on the market, but with the output of that product the ambitions of shoe manufacturers to serve the motoring public seem to have been realized. The up-to-the-minute motorist had adopted the rubber-soled shoe or oxford of tan leather for warm weather touring and has found such a shoe most practical, being comfortable and cool and affording a hold on the corrugated surface of the clutch and brake pedals.

Apparel Not So Expensive

Motoring garments for men are no longer luxuries, but necessities, and the day of prohibitive prices on coats is past. Touring apparel is not so expensive that the owner hesitates to give it the most practical wear. Prices of this year's coats range from \$25 to \$45. The motor coat of 1913 is extremely utilitarian, cut on serviceable lines and made of serviceable fabrics.

Craving pardon for any editorial discourtesy and reversing the accepted order of etiquette, a cursory discussion of motoring garments for women is now in order.

There was a time when Emma McChesney seemed but a myth, a creation of a Ferberized brain, but that was before a visit was paid to the exclusive salons of fashion, where fine feathers for the woman who motors are on display—coats and bonnets that would claim the attention and admiration of the most calloused woman-hater, gay raiment that would give the ugliest of ducklings the charms of a Venus.

The fictitious Miss McChesney has been working overtime during a dull winter, designing garments and hats for Milady Motorist, selecting brilliant colors and striking combinations that put to shame the hues of the rainbow. The landscape will be bright on Easter day, even though blossoming trees and verdant fields are matters for future delight. The modiste and the milliner, knowing the limitations of Mother Nature, have conspired to give the much-desired dash of color to Sunday's motor parade that would have been lacking had the lady with the magic wand been left to work alone.

Showing the chivalry of a southern gentleman, the designer of women's motoring apparel has aimed to insure milady the greatest comfort while she is in the car. Like the men's coats, the women's gar-

ments combine light weight with warmth. The coats are loose with full kimono sleeves and commodious arm holes and slightly cutaway at the bottom, making it extremely easy for the wearer to step to and from the running board of the machine. The majority of the garments shown have convertible collars, making them both practical and swagger.

It seems a pity that the coats themselves are not reversible, since in many instances the linings of richly colored silk and satin are as beautiful as the homespun, tweed and cheviot of which the garments are made. Copenhagen blue, emerald green, Nell rose and Bulgaria are the most popular shades for linings and facings and add a luxuriant touch to the most simply patterned coat.

April Showers Defied

For protection against the inevitable April showers, a tan gabardine, with close-fitting military collar, slash pockets, belted back and full sweeping skirt, is considered quite recherche. It is extremely manish, and therefore a most practical garment. A rainproof coat of rubberized silk challenges the gabardine for favor and doubtlessly will increase in popularity when the air is tempered with more sunshine.

Worsted, wool ottoman, imported tweed, vicuna and homespun are the fabrics used in the manufacture of spring garments primarily intended for warmth. The dark green vicuna coat should prove most practical for wear during March and April. It is double-faced with a plaid lining and

From left to right. The first illustration is a gentleman's motoring suit, shown by Capper & Capper, Chicago. It is made of brown Harris tweed. The coat, with large patch pockets and skeleton lined, is an extreme Norfolk, while the buyer has the choice of long trousers or knickerbockers

The second illustration is one of Marshall Field & Co.'s Barberry models, a silk-lined, sun-proof gabardine coat, a most practical garment for the motorist who boasts of his season's mileage

A conservative garment for the motorist who does not drive his own car is a homespun coat shown by The Hub, Chicago, is seen in the third illustration. It has a belted back, inverted pleat, patch pockets and English roll lapel collar

A single-breasted Guards coat of Gweedore homespun, imported by Marshall Field & Co., Chicago, is shown next



fastens with two large pearl buttons, one at the waist and one at the neck.

Close-fitting bonnets, draped with yards of diaphanous veiling, are the vogue in headgear. The day of wrapping the head like an East Indian nabob before going on a tour seems to be past. Toques of hemp braid and turbans of silk vie with one another for the discriminating woman's favor. Red is the prevailing color, although restful green and regal purple flaunt a determined challenge.

Several new models of touring hats are shown by Marshall Field & Co., Chicago. The most aristocratic is a Soudan helmet of black velvet with detachable white veil. Another, which may appear as being more practical, is a cap of rubberized ceru silk with vizor and detachable veil. A crusher of black and white checkered silk, faced with Copenhagen blue and ornamented with a bow of the same color, should prove ideal for a long trip.

Fancy vests for women are increasing in popularity and are a prominent feature in the tailored suits for spring motoring wear. They come in basket weave material in white with colored strips and also in silk and panne velvet. The vest fits snugly to the waist line and then turns away in a sharp V.

Raw silk sweaters are particularly appealing this season. They are in the straight models that fasten on the left hand side with crocheted buttons of silk. They have Robespierre collars and come in a variety of colors.

Shoes for Women Motorists

The cordwainer has paid more attention to the needs of the woman motorist than to the man. A new touring shoe this season is a tan boot and puttee combined that will be a protection with the short skirts worn on long trips. The shoe laces to the ordinary height, then the puttee straps into place. There also is a new high shoe of white buckskin that has a leather lift above a rubber sole that is most comfortable. It promises to be very popular with those who affect the white traveling suits.

White chamois gloves, with black stitching and smoked pearl button, harmonize well with any coat or hat milady may select and therefore are considered the proper thing.

If the motoring apparel shown in the smart salons of fashion is any criterion, the Easter cavalcade of 1913 will eclipse in grandeur and magnificence any of previous years since the day Henry Ford chugged up the main street of Detroit in his first motor car, to the consternation of its citizens.

O. C. Hutchinson Makes Change

Lansing, Mich., March 17—Vice-President O. C. Hutchinson, of the Olds Motor Works, has resigned from the position of general manager, and will go to Detroit in a short time to represent the interests of the company at that place. General Sales Manager J. V. Hall, who went to California to take charge of the branch at San Francisco, will return to Lansing. Mr. Hutchinson temporarily will occupy the position of general manager of the Lansing plant, but no general manager will be appointed nor any other official changes be made at this time.

Depew Man Buys the Thomas Assets

C. A. Finnegan Pays \$51,000 for Good Will, Patents, Stock, Etc.—Rumor from Louisville He May Decide to Establish Motor Car Plant in the Kentucky Metropolis

BUFFALO, N. Y., March 18—Special telegram—Goods estimated by receivers of the E. R. Thomas Motor Car Co. as being valued at \$500,000 brought approximately \$100,000 at auction of that firm's assets at the plant the first 2 days of this week.

C. A. Finnegan, president of the Empire Smelting Co., of Depew, N. Y., for the sum of \$51,000 purchased the good will of the firm, its patents and patterns and stock in trade at the plant and at branch service departments in New York, Boston, San Francisco and Los Angeles. Receivers placed value of these goods at \$400,000.

The sale opened Monday and will be concluded Friday when the around-the-world trophy, presented by Le Matin of Paris and the New York Times to the Thomas company as winner of the New York-Paris race, will be offered for sale, this being the last article to be sold.

Judge Hazel last December authorized George C. Finley and Adolph Rebadow, receivers, to hold this auction, and J. E. Conant & Son, Lowell, Mass., were designated auctioneers. Opportunity at auction is being given to prospective buyers to examine parceled goods in advance and the auctioneer refers to them only by number when they are placed on the block. Today 400 bidders were present. Paints and brushes, tires, electric motors, sheet metal, working tools, lathes, electric plating machinery and thirty-five lots of fine machinery from the experimental machine shop were disposed of.

May Locate in Louisville

Louisville, Ky., March 18—Special telegram—News was received here today of the purchase by C. A. Finnegan, a former Louisville man, of the machinery and stock of the E. R. Thomas Motor Car Co. at a receiver's auction sale in Buffalo. According to the telegram which contained the information, Mr. Finnegan is considering Louisville as a location for a motor car manufacturing plant. Mr. Finnegan is president of the Empire Smelting Co. of Depew, N. Y., and formerly headed a similar concern in this city.

CREDITORS MAY OPERATE PLANT

Columbus, O., March 18—Proposal that the Columbus Buggy Co., which recently went into the hands of a receiver, be taken over by the creditors and operated until all of the uncompleted product on hand can be finished and sold, is made in the report of the committee of creditors named on February 13 to investigate the status of the company and make recommendations as to the best method of procedure. The committee is composed of

George W. Bright, E. R. Sharp, George W. Lattimer, T. C. Dunlap, B. G. Watson and D. N. Postelwaite. The committee says that it believes if the business of the company is revived and continued under proper management, the creditors' claims might be paid eventually almost in full. The committee says:

It is, therefore, proposed that an order of sale be taken and that the property as a whole be placed on sale as soon as possible. Those creditors who desire to co-operate may do so through the creditors' committee, which will bid on the property and pay for it by the cancellation of the indebtedness of those creditors co-operating through the committee, and the remainder in cash, so that those creditors desiring a cash settlement may obtain their pro rata share from the receiver after the payment of the expense of the sale and receivership.

POPPEMBERG CASE SETTLED

Buffalo, N. Y., March 19—Special telegram—The Willys-Overland Co., Toledo, O., was awarded a judgment of \$5,895.83 against Gustave H. Poppenberg, Buffalo, in a decision filed with the county clerk at Buffalo yesterday, by Clark H. Timerman, referee. The papers filed claim Mr. Poppenberg in 1909 and 1911 was agent in Buffalo for Overland cars. The contract expired in 1910, but Poppenberg was unable to ascertain whether he was to have a new contract and consequently in August, 1910, he bought Overland cars amounting to \$19,630. When the time came to renew the contract, the Ohio manufacturers refused to grant a renewal. Poppenberg demanded a settlement of his account under the previous contract.

The Willys-Overland then sued to recover the purchase price of cars bought by Poppenberg, which amounted with interest to \$22,675.83, which amount was undisputed by the Poppenberg concern.

Timerman as referee awarded Mr. Poppenberg in his counter-claims \$16,780, the Overland company securing the balance.

BERGDOLL COMPANY QUESTIONED

Philadelphia, Pa., March 17—Three creditors of the Louis J. Bergdoll Motor Co. instituted proceedings today in the United States district court to have the motor car company adjudged an involuntary bankrupt. The creditors and their claims are: W. C. Rhodes, Inc., \$1,696.85; Chilton Co., \$505; Castle Lamp Co., \$1,772.85.

It is alleged that during the past 30 days preferential payments amounting in the aggregate to over \$33,000 had been made by the company as follows: To Erwin R. Bergdoll, \$31,200; C. A. Bergdoll Coal Co., \$400, and the North Broad Street Realty Co., \$1,500.

If the company is permitted to continue marketing its product throughout the year, an official of the company declared this afternoon, it would continue solvent.

Many Akron Tire Plants in Operation

Goodyear Working Day and Night and Goodrich, Diamond and Firestone Preparing for Double Shifts—Backbone of Strike Apparently Broken—Little Trouble of Late

AKRON, O., March 18—The situation in the rubber workers strike here has been exceedingly quiet during the past 3 or 4 days. The manufacturers say that more men are constantly returning to work. The Goodyear plant is now working day and night and the Goodrich-Diamond and Firestone plants are about to put on night shifts.

There has been no violence since last week. The police today raided a house and found a lot of dynamite. One of the strikers was arrested. The police say he had the dynamite. The I. W. W. leaders are responsible, the police say, for many cards being pasted on the homes of men who are yet at work in the rubber factories. The printed red signs bear skulls and cross-bones. They read: "Here lives a scab. Medical attention needed. Order of strikers health committee."

Scores of arrests are to follow. The police rounded up sixty suspicious characters in the city Sunday and arrested all. The state senatorial committee, which has been making a probe of conditions in Akron rubber factories for a week, adjourned tonight to Friday. As yet the committee has made but little headway and the grievances from the strikers have not materialized. The investigation, so far, is considered a farce.

GOODRICH MAKES ANNUAL REPORT

Akron, O., March 18—In his report at the annual meeting of the Goodrich company, President B. G. Work had this to say:

Since purchasing the Diamond company in April, 1912, excellent progress has been made in unification of Goodrich and Diamond organizations and their plants providing thereby for great improvement in economy and large increase in capacity. The report of the treasurer shows the company to be in strong financial condition.

It has been the policy of our directors to place the company upon sound economical basis of operation as quickly as possible, and while this may have interfered with showing of earnings for the period, they feel that the best interests of stockholders have been conserved for the future. In reference to the future I believe it should be the policy of this company to husband its resources and accumulate a substantial surplus, and I shall not recommend to directors the payment of a dividend on common stock for the current period nor until such time as a substantial surplus over and above the preferred dividend and amortization requirements shall have been accumulated from earnings.

Announcement has been made that W. B. Miller, vice-president and director of the Goodrich-Diamond company, has resigned and D. M. Goodrich elected in his place.

BATAVIA SUES SEAMLESS

New York, March 19—Special telegram—After having advised various tire companies of alleged illegality of casings with

treads resembling the Batavia non-skid, the Batavia Rubber Co., Batavia, N. Y., has brought suit in the United States district court, southern district of New York, against the New York branch of the Seamless Rubber Co., New Haven, Conn. The claim is that by making a tread stated to be an exact copy of the Batavia type, the Seamless company exerted unfair competition. The Batavia company demands a perpetual injunction against the Seamless, preventing it making treads which, according to the plaintiffs, were in several cases mistaken by buyers for Batavia treads, and it also calls for accounting of the business done in such treads in the past. It is stated that all other companies originally campaigned against by Batavia have either given up the manufacture of the treads in question or modified their exteriors.

S. A. E. PLANS SUMMER MEETING

New York, March 18—The midsummer meeting of the Society of Automobile Engineers will be held on the steamer City of Detroit on Lake Michigan on June 5, 6 and 7, the details of the program for this meeting have not been settled upon as yet. It is known, however, that a number of members of the Institution of Automobile Engineers and the Society of Motor Manufacturers of England will be guests of the S. A. E. at the time of the midsummer meeting. The itinerary program of the English society follows:

Wednesday, May 17—Leave Tilbury by the S. S. Minnewaska.
Monday, May 20—Arrive in New York.
Monday and Tuesday, May 26 and 27—In New York.
Wednesday, May 28—Leave New York for Pittsburgh.
Thursday, May 29—In Pittsburgh.
Friday and Saturday, May 30 and 31—In Indianapolis.
Sunday, Monday, Tuesday and Wednesday, June 1, 2, 3 and 4—In Detroit.
Thursday, Friday and Saturday, June 5, 6 and 7—Lake trip on Steamer, S. A. E. summer meeting.
Sunday and Monday, June 8 and 9—In Cleveland.
Tuesday, June 10—In Buffalo.
Wednesday, June 11—In Providence.
Thursday, June 12—In Bridgeport and New Haven.
Friday, June 13—In Hartford.

Among the works and factories which it is the intention of the party to visit are the Cole, Henderson, Marion, Marmon, National, Stutz and Waverley at Indianapolis; the Cadillac, Ford, Chalmers, Hudson, Packard and Timken axle at Detroit; the Peerless, Winton and Stearns at Cleveland and the Pierce-Arrow at Buffalo.

As the program states that women are especially invited it would seem that the customary excursions are to form a part of the approaching visit.

Members of the party who continue the trip to Providence will visit the Brown & Sharp Works there, and later the Loco-

mobile factory at Bridgeport. Some carriage works at New Haven and various tool and other factories at Hartford will also be inspected.

At the next S. A. E. meeting of the metropolitan section to be held in New York City on March 27 the society will take up for the first time the subject of electrical appliances for motor cars. The reading of a paper by C. C. Munson, with the subsequent discussion will form the first of a series of evenings dealing with this broad subject. After the reading of Mr. Munson's paper, Morris R. Machol will read a paper treating of light reciprocating parts.

CANNOT CUT HORN PRICES

Buffalo, N. Y., March 19—Special telegram—An injunction issued through the United States district court by Chief Justice White yesterday, in the case of the Lovell-McConnell Mfg. Co., Hutchinson Electric Horn Co. and Miller, Reese & Hutchinson against the International Automobile League of Buffalo, the defendants, their officers, agents and attorneys are ordered to refrain from advertising, circulating or offering deduction, discount or rebate from the prices designated by complainants at which said motor horns must be sold to the public as shown by tags, during the pendency of this action.

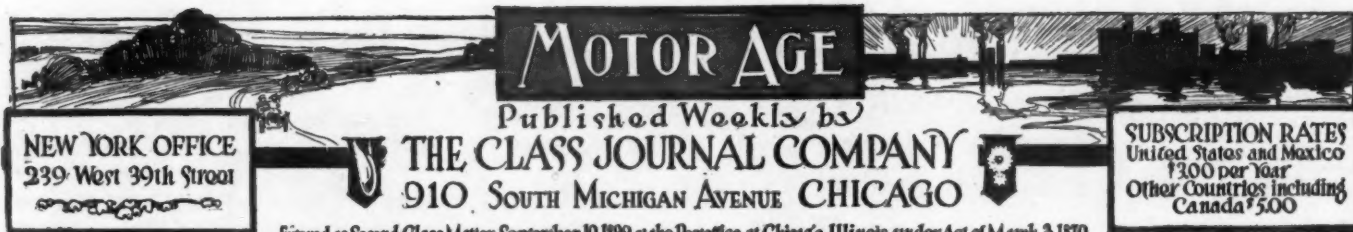
The injunction is a continuation of the preliminary order handed down when the appeal was granted the complainants in the circuit court on the refusal of the court to grant certain injunctions.

COLUMBUS PREFERS CARNIVAL

Columbus, O., March 15—The week's motor car carnival given in Columbus, O., for the week ending March 15, by the Columbus Auto Trades Association was a success despite unfavorable weather conditions which prevailed for the greater part of the time. The crowds were good and sales were numerous. Practically all of the Columbus dealers participated in the event and all have expressed themselves as eminently satisfied with the experiment. It is announced by the officers of the Columbus Automobile Trades Association that the carnival rather than the show idea will be followed in the future.

MORE CAPITAL NEEDED

Grand Rapids, March 17—A committee comprising E. Alfred Clements, L. A. Cornelius, M. Kirsch, Frank T. Hulswit and William F. McKnight has issued a statement to stockholders of the Grand Rapids Motor Truck Co., setting forth the need of additional capital, and proposing that the holders of the \$154,000 in preferred stock turn in their certificates in exchange for common stock, and that an additional \$100,000 in 7 per cent preferred stock be issued. The members of the committee agree to take \$50,000 worth of the new preferred stock, providing the whole amount be raised.



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Reducing Horsepower

THE ranks of the car manufacturer and also of the buyers are divided when it comes to the question of whether the present horsepower should be reduced for 1914 and successive years. All makers of large-horsepower cars are not agreed that there should not be a reduction, and the same is true of buyers. It is largely a question of individual satisfaction, which condition will continue for years. The owner who wants plenty of power for high-speed hill-climbing work is willing to pay for his whistle; then, too, the buyer who wants a large, comfortable vehicle to carry seven passengers and as much baggage as they want to take along also will continue to ask for power; but, on the other hand, the economist, who counts the cost of operation and who aims at getting the most miles out of each gallon of gasoline and the greatest distance out of a set of tires, will demand a smaller vehicle, less horsepower and reduced body weight.

SO far as the question of speed on the public highway is concerned, horsepower rarely is a determining factor, because the medium-powered machine can make considerably more than the legal speeds—in fact, often more than double of them. The builder of high-powered machines cannot hope to sell on speed possibilities, although there are a few makers who are indulging in national selling campaigns and putting forward excessive, in fact impossible, highway speeds as the prime consideration. Such can bring about little more than general disappointment.

THERE are, roughly speaking, three classes of buyers—the economist, the comfort type, and the speedster. Their numerical importance in this order. To date the economist has been the determining factor with hosts of buyers; his ranks are steadily increasing. The comfort buyer is increasing slowly; and the speedster clan is steadily losing ground. Next season

One-Man Control in Road Work

NEW YORK STATE, which has been looked upon as the cradle for legislation relative to operation and control of motor cars as well as highway construction and maintenance, has voted for a new form of highway control in which the entire highway affairs will be vested in one person instead of in a board of commissioners of three, as heretofore used. The commission of three was found, not only in New York state but in some others, to be an unfortunate arrangement, due to the difficulty of getting three officials to agree on the varied work. In two or three states where the triumvirate has been in sway it has generally resulted in a one-man control, the other two preferring to resign rather than make their position of equality one of servitude. Such internal friction is obviated with a one-man control, and the only object not to be lost sight of is getting a man big enough for the job and one who can be entrusted with the work.

CHIEF among the advantages of the one-man control idea in road construction and maintenance is the fact that the money that is split in salaries among several can be used to procure the services of an expert. This is an age of specialization, and the man in charge of successful road work must be a specialist in his line. Expert knowledge of the preparation of the roadbed, etc., is necessary.

the economist division will be the dictator in more than 60 per cent of the cars sold, and because of the majority he commands his requirements are bound to bask in the public eye to a greater extent than the other two divisions. He is demanding reduced horsepower, because he wants greater mileage per gallon of fuel, and he knows that this is only possible with the reduction of cylinder sizes. He asks for lighter body weights because a lighter body will give him increased mileage.

FROM the indication of today it is certain that the economist buyer will be satisfied in the matter of reduced power. There are enough 1914 models now on the highway to assure this. These models are built with slightly longer-stroke motors and reduced bore. Next year will witness a slight increase in the bore-stroke ratio, and consequently a reduction in rated horsepower. The reduced horsepower will be welcomed for yet another reason, namely, that annual registration fees will be slightly lower—a needed reform, in view of the increase in registration rates that have been passed during the past winter in not a few states.

IT is going to be a difficult problem to reduce body weight. It has been going a little higher each year of late; going higher because of the additional equipment the buyer has demanded. Adding demountable rims, electric starters with their heavy batteries, windshields, tops, and other equipment has added hundreds of pounds, and besides the added weight in themselves there is additional that extra weight incorporated in some of the chassis parts in order to make them adequately strong to care for the additional accessories. The net result is that Europe, which once built considerably heavier cars than America, is now leading America in the light car field. America will have to reduce the weight of its cars intended for the economist trade.

Metamorphosis of the Duster

IT has been said that the motor car has made its influence felt in every adjunct of our daily existence. One imaginative writer has depicted in verse the modern man dependent through life, from cradle to grave, on the gasoline-propelled vehicle. The motor car is pictured as an ever-present fides Achates from the moment the doctor arrives in his roadster to assist at the infant's birth, until, after passing through his seven ages, the gray-haired grandfather is carried to his last rest in a motor hearse.

THE development of the motor car from an unreliable machine of one cylinder to an efficient mechanical servant of unlimited capabilities has been mirrored in the glass of Fashion. A decade ago there was little demand for motoring apparel. Any inexpensive garment that would protect the clothes of the motorist in his greasy explorations under and about the car served an ultimate purpose. That garment was the duster, cheap and ill-fitting—a farmer's coat adopted for a work other than harvesting and sowing. After long being offensive to aesthetic taste, the duster has undergone a metamorphosis in the hands of the progressive designer. It harmonizes rather than clashes with the tonneau of most graceful lines and most luxurious body finish.

Uncle Sam's Object Lesson for Farmers

Americans Unable to Sell One-Third of Their Crops Because of Bad Roads

WASHINGTON, D. C., March 16—According to a statement issued by the federal department of agriculture, an improvement in the distribution of one-third of the crops of the farms of the country would be effected through the construction of a better system of public highways in the United States. This would eliminate much of the nation's waste and effect a saving of many millions of dollars, it is declared.

As a result of investigation of the economic value of improved roads, it has been found that on the basis of a \$9,000,000,000 crop, which was harvested last year, at least one-third remained on the farm. The consumer paid about \$13,000,000,000 for \$6,000,000,000 worth of products sold by the farmers, the latter receiving only 46 per cent of what the consumer paid.

On the basis of these figures Logan Waller Page, director of the office of public roads, has declared that if the roads of the country were put into better shape and properly maintained it would be possible for farmers to get to shipping point at all seasons of the year and dispose of this one-third crop which now goes to waste. The good roads soon would pay for themselves, Director Page declares, with corresponding-improved conditions for all time.

Facts About Petroleum

Status of Industry Outlined by G. D. Chamberlin for Germans

New York, March 17—An address prepared by G. D. Chamberlin, counsel for the National Petroleum Association, to be read before the German reichstag in connection with the illuminating-gas bills before that house, gives some interesting information on the present status of the petroleum industry.

According to the address, the entire refining capacity of plants operated by the former oil trust amounts to no more than 80,000,000 barrels a year, while the independent refineries have a capacity of over 63,000,000. The latter number 125. The ratio between Standard and independent oil refineries is, at present, according to the above figures, 56 and 44 per cent, respectively. In 1904 the ratio was 85 to 15, and as in 1911 the total number of refining plants was almost twice that of 1905, it becomes obvious that during that period they have grown 600 per cent.

The entire oil consumption in Germany for the purpose of illumination is about 6,000,000 a year and or this 5,000,000 are imported from the United States. As soon as the bill now under consideration in the reichstag was formulated, the independent refineries were informed of the opportunity of breaking into the German market and an inquiry was made as to the possibility of supplying the above-outlined oil demand of the empire. The result is that the independent producers are now able to supply to Germany 5,400,000 barrels a year, which could probably be made to suffice the demand.

The address, in an appendix, shows that during 1911 the world production of crude oil was 345,512,185 barrels of 42 gallons, an increase of 24,712,041 barrels over the previous year. Of the total production, 63.80 per cent, or 220,449,391 barrels, were produced in the United States and 19.16 per cent, or 66,183,691 barrels, in Russia,

while no other country contributed as much as 5 per cent of the total, although there were about another dozen oil-producing countries.

BIG TRADE BODIES MERGED

New York, March 19—Special telegram—The Automobile Chamber of Commerce, Inc., was organized here today by a formal merger of the former National Association of Automobile Manufacturers and the Automobile Board of Trade. The purposes of the new body are to advance each and every interest of the automobile industry and its members, to work for the enactment and enforcement of beneficial laws and to promote harmony among the members of the industry; finally to "acquire by grant, gift, purchase, devise or bequests, to hold and to dispose of such property as the purposes of the corporation shall require, subject to such limitations as may be prescribed by law, including inventions, letters patent and processes, or rights thereunder, for the benefit of its members and not for pecuniary profit." In a general way, the work of the new corporation will be along the same lines of that of its parent bodies. There is a possibility, however, that new kinds of work will be taken on. As for the arrangement of licenses for the members, who number 100, this will be settled in the near future. The first annual meeting will be held on June 4, 1914.

The officers of the corporations are: Chas. Clifton, president; W. C. Leland, vice president; Col. George Pope, treasurer; E. D. Chapin, secretary. The board of directors is composed of the following: Chas. Clifton, Chas. C. Hanch, Hugh Chalmers, Sydney Waldon, Samuel T. Davis, W. C. Leland, Windsor T. White, Wm. E. Metzger, H. O. Smith, Albert L. Pope, L. H. Kittredge, R. D. Chapin, G. W. Bennett and H. H. Rice.

Calder Joins International

New York, March 17—John Calder, formerly associate general manager of the Cadillac Motor Car Co. of Detroit, has accepted the appointment of acting vice-president of the International Motor Co., manufacturer of Mack, Saurer and Hewitt trucks. Mr. Calder will have general supervision over engineering design and production of the company's three manufacturing plants at Plainfield, N. J., Allentown, Pa., and New York city.

Gasene Is Not So Cheap

New Fuel Brought Out in East Not the Bargain Originally Reported

Warren, Pa., March 18—Officials of the Cornplanter Refining Co., the producer of the new motor car fuel, Gasene, reported in Motor Age last week, state that the company has been overwhelmed with inquiries in regard to the substitute for gasoline. The first notices that appeared in the local papers, stated that Gasene could be sold for from 3 to 4 cents less than gasoline, which was the case, but the Associated Press omitted the word "less" and in consequence the company has been swamped with letters from all parts of the country.

The Cornplanter company states that it has made extensive tests of Gasene on the various makes of cars in the neighborhood of the refinery, and the tests proved satisfactory to the users of the liquid. It is claimed that Gasene will do all the work of gasoline, looks and smells like gasoline and gives from 25 to 30 per cent more mileage per gallon. It is stated that practically all of the new fuel the refinery can produce for the coming year has been disposed of.

UNCLE SAM ASKS FOR BIDS

Washington, D. C., March 18—Sealed proposals for furnishing the United States government with a number of motor trucks have been issued by the general supply committee. The bids will be opened in this city April 15. The bids call for one electric motor mail wagon of 1,000 pounds capacity, one gasoline motor mail wagon of 1,000 pounds capacity; four electro trucks of 2,000 pounds capacity; four gasoline motor trucks 2,000 pounds capacity; one electric truck 3,000 pounds capacity; one gasoline truck 3,000 pounds capacity. Manufacturers desiring to put in bids should make application to the general supply committee for specifications and blank forms.

Running of Sweden's Annual Winter Tour

European Contest as Seen by an American



HUPMOBILE, FIRST TO START AND FIRST TO FINISH

By George W. Gaidzik

STOCKHOLM, Feb. 28—The sixty-eight cars entered in the Royal Automobile Club's eighth annual winter tour lined up behind the starting point in the Olympic stadium at Stockholm, Sunday, February 23. At 12 o'clock noon the first car to start, an American Hupmobile, was sent off, and following it at intervals of 2 minutes each, the rest followed. Never before has the writer seen or heard of as much interest and enthusiasm being shown in an event of this kind, as was exhibited by the Swedish public from the beginning to the end of this tour.

Big Crowds Pay to See Start

Notwithstanding the fact that a fairly stiff entry fee was required for entrance into the stadium itself, an enthusiastic throng was there to cheer each parting car on its way. This demonstration, however, was but a mere drop in the bucket, as compared with the mass of people that lined the sides of the road for more than a mile from the stadium; whilst at every village and town through which the tour

Editor's Note—George W. Gaidzik, former chairman of the technical committee of the Chicago Motor Club and who represented America in the Olympic swimming championships at Stockholm last summer, was an observer in the Swedish reliability, which gave him an opportunity to draw comparisons between the manner of conducting contests in Europe and in America. Mr. Gaidzik also represented Motor Age in the tour.

passed, it seemed that every inhabitant for miles around was there to see the passing of this great caravan. Even throughout the night and into the gray dawn of the second day of the tour, crowds of cheering people stood on the roadside to see the bright-eyed dragons pass.

28 Hours on the Road

As for the tourists themselves, except for the hardships of having to travel continuously for more than 28 hours without a halt of more than a few minutes at a time, the contest was like unto a great joyride from start to finish. Owing to the comparative mildness of the weather, the heavily fur-clad travelers were more apt to be uncomfortable from the heat than the cold; whilst the absence of snow on the road, for almost the entire distance, made the ride so smooth and unexciting that the greatest effort was required by drivers and particularly observers, to keep from falling asleep.

The entire trip from Stockholm to Gothenburg and back, covered a distance of 700 miles, and more than half of this distance was traversed before reaching Göteborg, where a stop of 12 hours was allowed for rest. Of course, there were control stations at convenient locations between Stockholm and Göteborg, where a stop could be made for fuel, oil and food, without penalty. The time thus consumed however had to be added to the schedule time, and it could not be made up en route. For example, if a car remained an hour at a control, it would not be allowed to enter the next control until an hour after its



GATERBORG CUP AND EMBLEM OF ROYAL AUTOMOBILE CLUB OF SWEDEN

scheduled time of arrival; whilst, if for any reason the car was stopped en route, the time so consumed

also must be added to the schedule. This is a rule that could most advantageously be incorporated in the American rules governing such contests, for it really has the desired effect of eliminating speeding.

As now interpreted, the American rules permit a contestant to arrive just outside of a control station any time before the scheduled time of arrival, then stop the car and wait until time to enter or pass the control; in fact, the car may be stopped any time en route as long as the motor is kept running, and without having to add the time of the stop to the arriving schedule. Here—abroad—the car cannot be stopped anywhere except within the boundaries of the control station without the time being added to the arriving schedule. As a result, here abroad every contestant endeavors to drive as close to the pace as possible, no pacemaking car is required to hold back the more enthusiastic ones, there is less reckless driving and, on the whole, a more orderly procession is obtained.

Conditions Not Severe

As a test for car and driver, though an excellent one, it is by no means as severe as an American Glidden, or even one of the Chicago Motor Club's 1,000-mile reli-

ability runs; what it has been in previous years though and how it might have compared this year if the usual amount of snow had to be contended with, is still a question in the mind of the writer.

The roads in Sweden generally are better than the average western or west central American roads, and though several fairly steep and difficult hills were included in the highway bill of fare, these were hardly to be included among the seven wonders of the world. Better hills are to be found in America and other parts of Europe, and perhaps even in other parts of Sweden. Still, it must be borne in mind that it is the usual presence of deep snow that perhaps has won for this Swedish tour its reputation for severity.

Contestants Enjoy Scenery

From a scenic point of view, one's only regret is that so much beautiful landscape is lost in the night, though a bright moonlight might have added an extra charm to the journey; but here again the tourists were cheated by the weather man who must have shrouded the big full moon behind an impenetrable bank of clouds, for we saw it not. During the day, however, the every-varying scenic aspects made monotony quite impossible.

No two towns or villages were alike; even in the construction and arrangement of houses there was a charming lack of similarity both in design and situation. Between the houses and villages there were generous stretches of alternate flat and rolling farm lands where panoramic outlooks were obtainable; then before one could drink in the beauty of it all, the car would plunge into a silent forest of tall and stately evergreens, through which the roadway rose and fell, over hill, through vale, and wound around the irregular shores of many lakes and fjördes.

Only on a few of these forest-clad heights was snow to be found on the route and even here, with the exception of one or two stretches of a few miles each, was this more than 6 inches deep. Most of the snow-covered roads were packed hard and

smooth, and only difficult to negotiate in so far as they were slippery.

As one drew near the west coast of Sweden, the great forests of evergreens dwindled off, and gave way to a very irregular rocky and mountainous country which gradually descended to the sea. Notwithstanding the charm of these landscapes, however, 28 hours of constant travel, with meals consisting of sandwiches and the contents of a vacuum bottle, which, owing to the motion of the car, only could be comfortably consumed by a juggler, the arrival at Göteborg was keenly anticipated and appreciated.

After checking in at the Palace hotel in Göteborg, the cars proceeded to a fuel station where they replenished the fuel and oil supplies, then they were driven to a large garage, where competent officials were at hand to see that the cars were orderly arranged for a convenient subsequent departure.

Except for the welcome of the crowds that surrounded the hotel and lined the streets through which the tourists passed, the arrival was marked by no demonstration of revelry. It was a haven of rest to be taken full advantage of as such, and after a refreshing bath or wash, a real meal and a little walk or talk, all retired at an early hour.

Start Back for Stockholm

Twelve hours after checking in at Göteborg the cars were required to start away on the return journey, and many of them were on their way back to Stockholm before daybreak.

Though a more southerly route was taken by the cars homeward bound, for those who got away from Göteborg before daybreak, but little of the characteristic scenic beauty proved to have been lost during the night of the fore part of the trip, for scenery similar to that which then was involved in darkness was now passed through by daylight.

Cars which left Göteborg shortly before daybreak were scheduled to arrive in Stockholm about midnight of the same day, and at a point about ½ hour's jour-

ney from Stockholm, each car was stopped opposite two red lights, which marked the starting point of a long hill, the speed of the ascent of which was to be timed, and figured in determining the winner of the tour, the time being taken by the observer in the car, with a stop watch specially provided for the purpose. The start was a standing one, both the car and observer's watch being required to start at the word "Go" from an official. At the top of the hill, which also was marked by two red lights, one on either side, the observer's watch was stopped, and as the car proceeded on its way the time was read and noted in the observer's book.

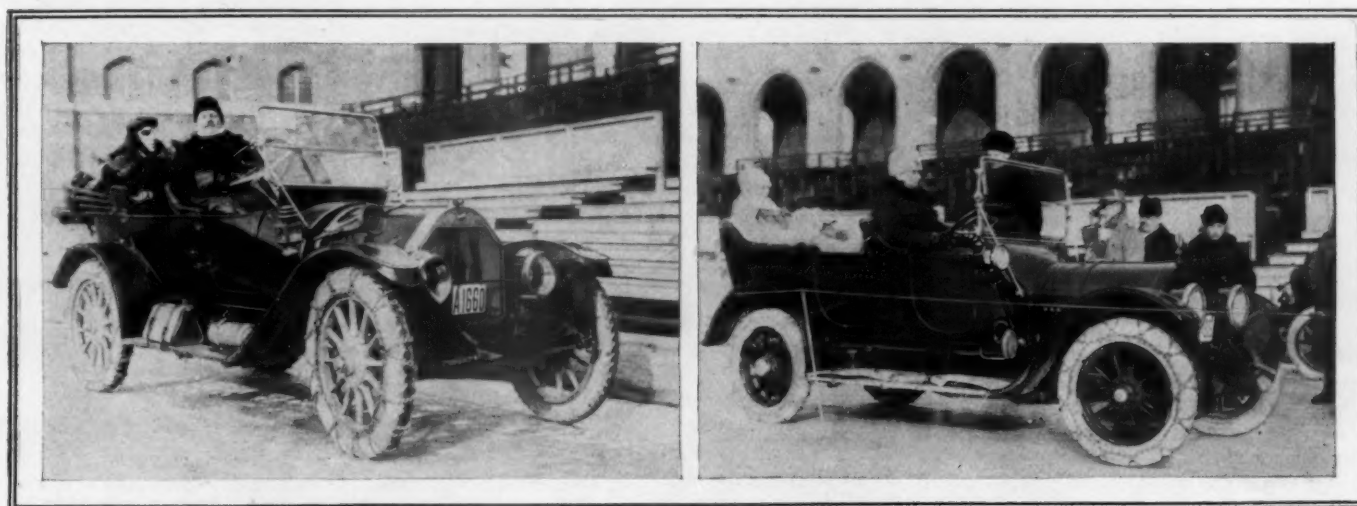
Curbing the Scorchers

The last control before entering Stockholm was at Liljeholmsbron at the outskirts of the city, and consisted simply of a green light suspended from a post on the roadside. On passing this green light the observer was required to record the time in his book, and between this point and the checking-in station at the Grand hotel, in the heart of the city, a reduced rate of speed was demanded, and the schedule altered accordingly. Thus, scorching was fairly effectively curbed.

On arrival at the Grand hotel, which also was approached through masses of people, the observer made his final notations in his book, compared watches with that of the timers, notation of any difference between the watches was recorded, then the observer handed his book over to the official and the car was dismissed.

No final examination of the car was necessary, it being simply required that the car arrive at the Grand hotel, the finishing point, under its own power. Before entering the contest, of course, the car is required to meet certain stock car qualifications, and from the start to finish all delays, repairs, etc., were required to be noted in the observer's book, from which the winner is subsequently determined by the judges.

The writer never has seen a tour of this kind so orderly arranged, so smoothly run, or so ably conducted.



TWO OF THE AMERICAN CONTESTANTS—OVERLAND AND CADILLAC

S. A. E. Committee Gathers Rim Data

While No Definite Action Follows Meeting in Cleveland, Yet Advocates of Standardization Feel Considerable Was Accomplished—Three New Types Among Those Exhibited to Tradesmen Making Investigation

CLEVELAND, O., March 13—While no action whatsoever was taken at the meeting here this week of the rim standardization division of the standards committee of the Society of Automobile Engineers, yet it is felt that considerable progress was made and that developments may be expected at the next meeting, which is to be held in New York, April 2.

If the future deliberations of the committee are conducted with as much dispatch and are as productive of valuable information as to the construction, operation and manufacture of the various types of rims on the market, as was the opening meeting yesterday, the division soon will be in a position to submit recommendations to the society for both quick-detachable and demountable rims for clincher and straight-side tires.

As reported briefly in Motor Age last week, the meeting was in the nature of a hearing, some fifty pneumatic tire, wheel rim, steel band and motorcycle manufacturing companies being invited to send representatives to expound their views and to show their types of products for the edification of the committee members. About thirty-five rim makers and others interested were in attendance, while ten manufacturers availed themselves to present samples of their rims. Of course, there are many more well-known rims which will have to be seen by the committee, but a very good start was made.

Three New Rims Shown

There were three types of rims which never were exhibited anywhere before, these being the new No. 60 Stanweld, which is a light demountable of the split ring type; the Midgley rim which is fathered by the United States Tire Co.; and a new Goodyear quick-detachable design.

In opening the hearing, Mr. Souther touched upon the movement made in 1908 to check the then rapidly increasing number of types of rims, which movement eventually failed, inasmuch as there are today more styles of demountables and quick-detachables than ever before.

To facilitate the work of uniformly recording the testimony of the various makers, a list of the points considered vital to the investigation was prepared previous to the hearing. The witnesses were generally examined along these lines. The committee has recognized the work of the Clincher Rim Association as applied to the one-piece rim, and it was made clear that while standardization is sought, this will not be done in a way that will put any maker out of business. The idea is

By L. V. Spencer

not to impede rim progress either, the division taking the stand that anything which it now determines as standard shall not necessarily hold in the event of something better being developed in the future. This policy is in line with that of the entire standards committee as relating to anything which it standardizes.

Rim Makers Given Hearing

The makers showing or simply explaining quick-detachable rims entirely independent of any demountable features were first heard, there being four of such in attendance. These were the Mott Wheel Works, the Firestone company, the Goodyear company and the Standard Welding Co. Each of these, however, also makes demountable types which were later taken up.

Each maker was questioned as to the weight of his rim, whether it could be sold in competition, how it withstood service, method of operation, number of loose parts, its adaptability to wire wheels, whether the standard dimensions of the clincher tire association has been adhered to and whether it could be manufactured in any mill without special machinery. Other special questions were put in order to bring out as far as possible every point and feature of every type considered.

The morning session was brought to a close after only three of these four quick-detachable types had been taken up, and it looked as if several days would have to be devoted to the matter, inasmuch as it was the firm intention to give a full hearing to all. However, under Mr. Souther's efficient method of conducting the session, the roll call was completed about 6 o'clock.

Following the explanation of the Standard Welding quick-detachable, which was the last of this type submitted, the afternoon session confined itself to the demountables, which are the biggest consideration of the committee, there being such a wide divergence of meritorious designs.

In addition to the questions asked of the quick-detachable exhibitors those who showed demountables—of which there were ten—also were asked as to the distance between supports of the outer rim, whether these had any relation to the position of the spokes, as to the waterproof qualities, whether the rim would squeak in extended service, and so on.

Much valuable data was collected on each type, and the quizzing of the committee members was assisted by that of the other experts in attendance, but not on the committee. Criticisms offered by the

latter as to contemporaries' offerings were often edifying to the division.

The minutes will be gone over carefully in the society's offices in New York and the data relative to each make will be digested and put in uniform style for the ready reference of the committee.

In closing the hearing, Mr. Souther stated that great amount of information obtained made it very evident that more time was needed by the committee and each rim concern was requested to send its samples to the society offices in New York in time for the next meeting. In the event of any companies not being able to furnish its exhibits to the committee there, it was requested to at least send on blue prints or sketches. The exhibits can be sent at any time, as the society can make room for them very easily in its present commodious quarters.

Mr. Souther assured all that prompt and intelligent action would be taken by the committee and its findings reported as soon as possible.

Plans for Future Made

Following the hearing, the committee held a short session to determine just what method of procedure to follow in rounding up the rest of the necessary information and taking care of that already obtained. It was decided to hold the next meeting on April 2 at the New York headquarters.

The concerns having exhibits of demountable rims at the meeting were: American Rim Co. (Lambert), Anglada Co. (Parker No-Felloe), Detroit Demountable Rim Co., Firestone Tire and Rubber Co., R. W. Funk, Goodyear Tire and Rubber Co., Standard Welding Co., Universal Rim Co. (Baker), United States Tire Co. (Midgley). The Mott Wheel Works did not have a sample to exhibit, but by means of blackboard sketches, O. W. Mott explained it to the committee. Several other representatives were on hand, but when called upon, stated that they had nothing to say or to show at this time.

CASE MAKES ANNUAL REPORT

Racine, Wis., March 15—The annual report of the J. I. Case Threshing Machine Co., of Racine, Wis., shows a splendid increase in the motor car department for 1912, as compared with 1911. The general income account of the big concern is as follows:

	1912	1911
Gross sales.....	\$14,854,945	\$9,163,749
Operating expenses.....	12,084,172	7,654,559
Net income.....	2,770,773	1,509,191
Charges	506,338	448,240
Surplus and dividends..	2,264,485	1,060,951

Gross sales in all departments show an increase of 60 per cent and the increase

in net income is approximately 50 per cent. The amount available for dividends on the \$12,000,000 preferred, 7 per cent cumulative, outstanding was 2.7 times the amount required, leaving a surplus of 18 per cent available for the common stock. Of the gross sales of \$14,026,633.93 in 1913, the domestic sales aggregated \$9,841,782 and the export sales \$4,184,851.93. Regarding the motor car department the report says:

The motor car plant was acquired by the company in September, 1912, at a cost of \$450,000, paid in stock. The plant is located just outside the city of Racine, and comprises 4 acres of ground and new buildings, and equipment admirably adapted to the manufacture of the company's limited line of motor cars. From January to September, 1912, the output of the plant was billed to the company at net prices, resulting in a net manufacturing profit for that period of \$133,343.23, which sum, as it accrued prior to the acquisition of the motor car plant, is not included in the income account of the profit of the company, and it has been added directly to its surplus, as appears in the balance sheet. A like net manufacturing profit of \$22,829.41 arising since the acquisition of the plant, is included in the income statement for the year. These sums are in excess of the profits of the company arising from its sales of motor cars, which profits are included in the income account.

WAGENHALS TO INCREASE STOCK

Detroit, Mich., March 15—The Wagenhals Motor Car Co. is planning a capital stock increase from \$100,000 to \$500,000 within the next week or 10 days.

Considerable Detroit capital is looking favorably upon the possibilities of the Wagenhals type of commercial tri-car. An announcement of those interested and about to be interested is not made public at this time. Mr. Wagenhals' associate in the business is William Pfum, formerly of the National Cash Register Co., Dayton, O.

With its contemplated great increase in production, the Wagenhals company cannot remain in its present small quarters for any length of time and it has not been decided yet as to whether to seek a more desirable location in this city or to go to Dayton. The latter city is favored, according to Mr. Wagenhals.

BUFFALO HAS BIG TRUCK SHOW

Buffalo, N. Y., March 18—The development of the motor truck in Buffalo during the past few years has been something phenomenal as was shown at the first annual commercial vehicle show held in Buffalo, March 11-15, under auspices of the Buffalo Automobile Dealers' Association. Thirty exhibitors of Buffalo displayed their trucks at the show and sales were numerous, one firm disposing of several trucks to a Niagara Falls company, while one motor vehicle was shipped to New Orleans. The outlook for the motor truck industry is unusually bright.

HARRISBURG SHOW OPENS

Harrisburg, Pa., March 17—The fourth annual show of the Harrisburg Automobile Dealers' Association was opened this evening. The show will continue for 2 weeks. There are thirty-five exhibitors and more than thirty different makes of passenger cars and commercial trucks.

Great Prosperity in the South Cotton Crops So Good that Many Cars Ought to be Sold

NEW ORLEANS, March 15—Despite the fact that the 1912 cotton crop amounted to nearly 15,000,000 bales, prices have remained high during the whole selling period. Cotton planters in this section of the south are in better shape financially than at any time since the civil war. Not only was the 1912 crop large, but in 1911 a still larger crop was secured. This has resulted in the preparation of additional acreage this year.

Thus far the season has been most propitious. Just the proper amount of rain has fallen to prepare the ground for the crop, and hopes already have risen high as to the possibilities of the new crop. If three big crops can be brought in in 3 successive years it is certain that a great deal more money will be put in circulation than ever before has been the case here.

Success of the cotton crop has a decided bearing on the motor industry in the south. It will have more influence than usual this year from the fact that hundreds of miles of improved roads have been built within the last 12 months and the possibilities of the passenger car in the farming districts have increased. If the returns from cotton are such as will enable the road improvement to go ahead at the same rate as at present there will be more cars sold during the next 18 months than in all the history of the motor car in this territory previously, it is predicted.

Prosperity in the cotton industry not only affects the sales of cars to farmers

but to the very important portion of those residing in the towns and cities, who are interested in some phase of the cotton business. The compress men, the buyers, the brokers and the membership of the cotton exchanges form a class that buys cars. In heavy-crop years this class is much more numerous than at other times, and in consequence a big demand for motor cars is anticipated.

Outside of cotton there has been a very general improvement in the gulf states, which is tending to a better condition among the rural population. Diversification has taken enough hold to insure a considerable profit outside of cotton. The field for motor cars in this section is a promising one because of the long season. In fact, there is no season, for a car can be used in comfort the year round. The fact that there are fewer cars in this section per capita means that there is a much larger field in which to place them, once the conditions are ripe for their more general introduction.

KNIGHT DECISION RESERVED

London, March 1—The appeal in the case of Knight & Kilbourne from the decision of Justice Neville, who found in favor of Argylls, Ltd., was heard last week and the court reserved its decision. The Silent Knight people argued that their patent was a master patent for a totally new character of combination and covered the Argyll engine. It also was denied that the patent was invalidated as the patentees had not claimed the part in which the error occurred and that the mistake had not misled any competent person.

Annual Paris Salon to be Held in October This Year

PARIS, March 8—Paris will open the European show season with its exhibition in the Grand Palais during the month of October. This change from December to October was proposed in order to reduce the present slack season between the end of the active selling period and the placing on the market of the following season's models. It is believed that by making this change at least 2 months will be gained to the French trade, for work on the 1914 models will be begun about July, instead of being held back until September, as at present.

Recently the whole of the French trade has been consulted on this matter, with the result that a unanimous decision has been arrived at in favor of the early show. No official announcement has yet been made on the date of the Paris exhibition, but in view of the favorable opinion expressed by the six individual trade associations responsible for this event the adoption of the early date cannot be doubted.

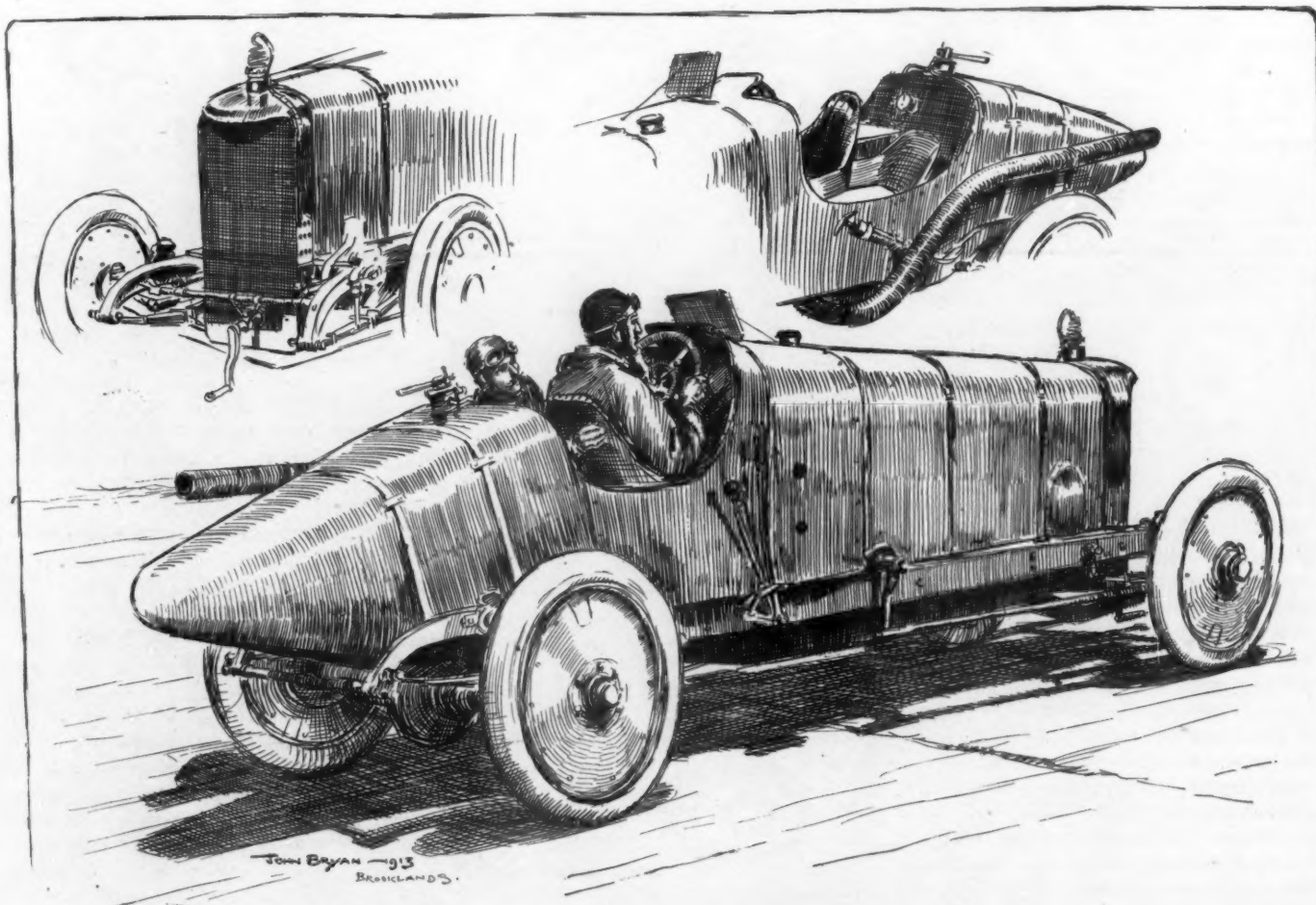
There appears to be but one difficulty in the way, and this can doubtless be removed. A society of artists has an option

on a portion of the Grand Palais for an art exhibition during the month of October. In view of the enormously greater importance of the motor show, a request will be made to the artists either to change their date or find another hall, and it is not supposed that this request will be refused.

The change in the date of the Paris show doubtless will be accompanied by a change in the duration of the show. Up to the present the Paris salon has lasted from 19 to 22 days, being open both on weekdays and Sundays. It is now proposed to reduce the period to 10 days, the show opening on a Friday or Saturday and closing on the following Sunday or Monday week. This will give 10 clear days, including two Sundays. If the short show is adopted the exhibition will probably be kept open until 7 or 8 o'clock in the evening, instead of closing at 6, as at present. The 1913 show will again have Henri Cezanne as its general manager. A joint committee representing six trade associations, has full control over the exhibition. The dates for the English show have not been announced.

Foreigners Tune Up for Yankee Invasion

Sixteen Entries In for Indianapolis 500-Mile Race

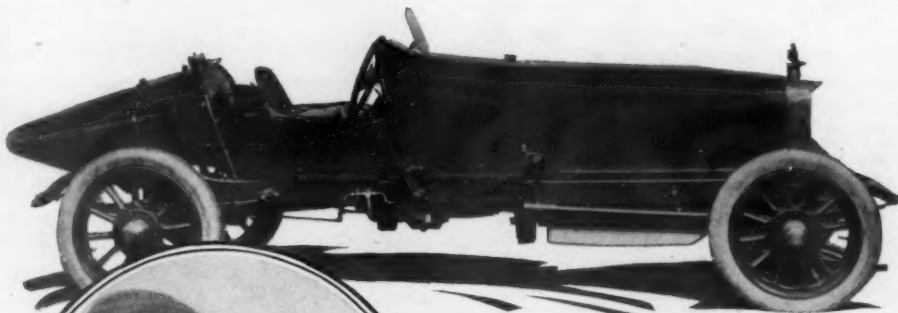


INDIANAPOLIS, Ind., March 15—No longer is there any doubt as to the competition of at least three foreign cars and drivers in the 500-mile race, set for May 30, because last Wednesday the speedway people received the entries of the two Peugeots from France and the English Sunbeam. The Sunbeam has been given No. 9 and the two Peugeots 15 and 16.

As the list now stands there are fourteen cars nominated for the international sweepstakes and the numbers assigned are as follows:

No.	Car.	Driver.
1.	Stutz	Anderson
2.	Stutz	Merz
3.	Nyberg	H. Endicott
4.	Keeton	Burman
5.	Mason	
6.	Mason	
7.	Unknown	
8.	Stutz	Herr
9.	Sunbeam	Guyot
10.	Henderson	Knipper
12.	Fox Special	Wilcox
14.	Smada	Adams
15.	Peugeot	Zuccarelli
16.	Peugeot	Goux

It is expected that the foreign contingent will land in New York about May 12, coming directly here to start training. Word comes from Europe that the Sunbeam has been returned to the factory for slight modifications. Since it established its records at Brooklands it



THE ENGLISH SUNBEAM AND ITS FRENCH DRIVER, GUYOT



has been made several miles an hour faster. Among the new features is a radiator for cooling the lubricating oil.

The Sunbeam car has six cylinders in

pairs of 3.54 by 6.29 inches bore and stroke, giving a cylinder area of 380.8 cubic inches. The valves are on one side with their stems inclined so as to obtain a more efficient form of combustion chamber. The motor has a forced-feed water circulating system, high-tension Bosch magneto, and Claudel carbureter. The lubrication is under high pressure to the main bearings and through the hollow shaft to the connecting rod ends. A large quantity of oil is in circulation and arrangements are provided for cooling it while in circulation. Up to the present this car always has been equipped with

Sankey steel detachable wheels. It is probable that the same will be used at Indianapolis, with Palmer cord tires.

To come within the Indianapolis rules, the cylinder bore of the Peugeot racers has been decreased from 110 to 108 millimeters. As their stroke is 200 millimeters, the cylinder area will be very close to the 450 inches allowed under the rules. With the exception of the fitting of the smaller-bore cylinders the cars have undergone very little change. They have overhead valves directly operated by a patented type of camshaft and pushrods placed over the center line and some distance away from the cylinder heads.

The cars are fitted with Bosch magneto and Claudel carbureter and have lubrication under very high pressure to all parts. The oil is cooled by deep ribs on the base chamber. A three-point suspended subframe carries the motor and gearbox, the final drive being by propeller shaft without the use of radius rods or torque tubes. The cars will be fitted in the race with Rudge-Whitworth wire wheels; the tires have not yet been chosen. At present the gear ratio is 2 to 1. This doubtless will be retained, changes being made on the wheels to get the exact ratio necessary for the track. Jules Goux and Paul Zuccarelli will be in charge of the Peugeot pair.

R. C. Gilhooly and his mechanic, Steinbolt, were in Indianapolis last week to try out the speedway with his huge 180 horsepower Isotta touring car. Mr. Gilhooly brought the car to Indianapolis in order to try out the track before going to Milan, Italy, to prepare the three racing cars which the Isotta-Fraschini Co. will send to this country to compete in the 500-mile classic. Grant and Trucco will be two of the drivers, it is said. Gilhooly will drive the other.

F. E. Edwards, chairman of the technical committee of the A. A. A., has been appointed to the same position in the 500-mile classic.

VANDERBILT A 450-CLASS RACE

Savannah, Ga., March 17—The Savannah Automobile Club has announced that following the example of Indianapolis and Elgin, the Vanderbilt cup race will be for cars 450 cubic inches and under.

SCHIMPF OFF TO COAST

Chicago, March 18—William Schimpf, chairman of the contest committee of the American Automobile Association, passed through here today on his way to Los Angeles, where he will confer with the leaders of the movement which led to the formation of the Western Automobile Association. It is believed that an amicable understanding will be reached and harmony restored. It is understood that the W. A. A. desires to affiliate with the A. A. A., with the privilege of managing Pacific coast affairs because of the great distance between California and New York.

Road Race on Isle of Man England Will Promote Stock-Car Event on September 25

LONDON, March 7—The regulations governing the international stock car race for the Tourist trophy to be held on Isle of Man, September 25, have at last been issued and they show the race of approximately 300 miles or eight laps of the circuit. It is for four-cylinder cars with cylinder bore not exceeding 90 minimum—3.543 inches—and 140 minimum stroke—5.512 inches. The minimum weight of each car is 2,000 pounds as it will compete in the race and includes driver, mechanic, fuel, oil, water, tools, etc. The cars must be stock in all particulars excepting that the angle of the steering column may be altered to suit the driver.

To insure stock throughout the rules are framed with special care and call for same make and size of carbureter and intake manifold as stock; no higher gear ratio may be used than the highest ratio fitted to stock cars; shock absorbers may not be fitted; no extra oil feed arrangements to the motor permitted and any oil tank must be of stock size and in stock positions; a gasoline tank to carry not less than 30 gallons may be used; mudguards for the wheels with continuous running boards must be used, the front ones being not less than 10 inches wide and the footboard and rear mudguards not less than 8 inches wide; and only wheels of sizes specified in the maker's catalog shall be allowed.

The entry fee is \$250 per car. The race may be canceled if not more than twenty entries are received by May 31. Entries will close June 30.

GRAND PRIX NUMBERS DRAWN

Paris, March 7—Victor Rigal, driving No. 1 Sunbeam, will be first to start in the French grand prix race at Amiens on Saturday, July 12. This position has been decided by the drawing of lots, the complete order in which the cars will get away, probably at intervals of half a minute, being as follows: 1, Sunbeam; 2, Delage; 3, Opel; 4, Mathis; 5, Excelsior; 6, Th. Schneider; 7, Itala; 8, Peugeot; 9, Sunbeam; 10, Delage; 11, Excelsior; 12, Th. Schneider; 13, Itala; 14, Peugeot; 15, Sunbeam; 16, Th. Schneider; 17, Itala; 18, Peugeot; 19, Sunbeam; 20, Th. Schneider.

The race being run on a fuel consumption basis, it has been decided to allow the competing cars to fit gasoline meters of the type approved by the octroi of the city of Paris, on condition that the fittings are of such a nature as to make the introduction of fuel through the meter or the connections an impossibility.

SMALL CAR RACE ANNOUNCED

Paris, March 9.—Official announcement has been made that the French light-car race will be held at Boulogne on Sunday, September 21. This race, which now has

become a classic, having been held for 3 years in succession with considerable success, is open to cars having a cylinder area of not more than 3 liters, or 183 cubic inches. A maximum weight limit of 1984 pounds without water, oil, gasoline, tools or spares, also is imposed.

TRUCK ROUTE SELECTED

Washington, D. C., March 16—The tentative route of the motor truck reliability run of the Washington Post, May 5-8, has been selected, and the work of blazing the trail began today when a Marmon car, driven by Arthur Foraker and carrying Pathfinder Harry Duckstein, was sent over the course. The tentative route will carry the trucks through two states and the District of Columbia and will afford varying road conditions, including numerous hills and sandy stretches. The distance will be between 300 and 350 miles. Among the towns the contestants will pass through are Frederick, Md., Hagerstown, Md., Harrisburg, Pa., Shippensburg, Pa., and Baltimore, Md.

Government officials are taking an active interest in the run and a number of them will be selected as officials.

PLANNING A. A. A. TOUR

Minneapolis, Minn., March 17—The general committee representing the motoring and commercial organizations of Minneapolis has accepted the offer for hotel trains for the 1913 annual national reliability tour of the American Automobile Association, fixed the starting date as July 11, with Sunday stop at Fargo and a second stop at Havre, Mont., to accept the invitation of the Havre Commercial Club.

The tour is about 1,200 miles and will end the following Saturday at Glacier Park station, Mont. The announcement of the tour is being made this week at the international travel and vacation exposition at the Grand Central Palace, New York, in connection with motion pictures and views along the proposed route as followed by the Minnesota State Automobile Association in 1911.

Asa Paine, fifth vice-president of the A. A. A., was made chairman of publicity for the tour.

AJAX PROMOTES TIRE CONTEST

New York, March 15—The Ajax-Grieb Rubber Co., has hung up \$5,000 in prizes to be distributed among users of Ajax tires, who get the best mileage records between April 1, 1913 and March 31, 1914. The three judges will be Alfred Reeves, of the Hartford Suspension Co.; M. L. Scudder, a New York public accountant, and R. A. Paterson, president of the Tarrytown National Bank.

There are to be 208 prizes distributed as follows: One prize of \$500, one prize of \$300, one prize of \$200, five prizes of \$100, ten prizes of \$50, forty prizes of \$25, fifty prizes of \$20, 100 prizes of \$10.

Indiana Passes New Motor Regulations

Registration Fees Raised and Made Annual Instead of Perpetual—New Yorkers Invade Albany and Squelch Threatened Legislation—Connecticut Satisfied

INDIANAPOLIS, Ind., March 17—The Indiana legislature has passed a law requiring an annual state motor license, which has been approved by Governor Halston and will become effective May 1. Heretofore it has been necessary only to pay the state a registration fee of \$1, which did not have to be renewed. The new law forbids any municipality from exacting a license fee and this will mean a loss of \$30,000 a year to the city of Indianapolis alone. Under the new law, the state license will be as follows:

Motorcycles, \$3.
Motor trucks, regardless of horsepower, \$5.
Electric cars, \$5.
Pleasure cars, 15 horsepower and under, \$5;
15 to 25 horsepower, \$7.50; 25 to 35 horsepower, \$12.50; 35 to 50 horsepower, \$15;
over 50 horsepower, \$20.

The purchaser is to be allowed to operate under the license number of the dealer for 15 days after buying a car or motorcycle.

The numerals on the number plate are to be 4 inches high, with a 5/8-inch stroke and the color is to be changed each year. Manufacturers and dealers are to pay a license of \$15 a year and may obtain as many duplicate number plates as may be required at \$1 each. Motor car owners from other states, complying with the motor license regulations of their own states, need not pay an Indiana license provided their own states grant similar reciprocity.

There also is a provision for the licensing of chauffeurs, requiring an examination by examiners to be appointed by the secretary of state. The annual license fee is to be \$5. The legal speed is fixed at 10, 15, 20 and 25 miles an hour, graduated according to the manner in which each district is built up.

The revenue under the act is to be placed in a road fund and prorated among the counties of the state. Upon a second conviction of the act, a chauffeur's license may be revoked 3 months and upon a third conviction for 6 months, to which not exceeding 60 days' imprisonment may be added.

There also is a new law in Indiana making it a misdemeanor for any person to take or use a motor car without the owner's consent.

NEW YORKERS SCORE AT ALBANY

Albany, N. Y., March 13—More than sixty motor clubs of this state and representatives of dealers from New York and other cities were present here today for the hearing before the committee on internal affairs on the new motoring legislation, the delegates filling the assembly chamber, which was used for the hearing.

Never before has motoring New York presented such a united phalanx and never before have legislators realized the determination of motorists to have fair play in legislation. As a result of the hearing it is generally conceded that nearly all of the bills will be allowed to die in committee and that practically the Callan law of today will continue.

President A. J. Deer of the New York State Automobile Association had charge of the delegates for the hearing. Melvin P. Bender, counsel for the organization, opened the hearing and was followed by Charles Thaddeus Terry, counsel for the dealers. Many others spoke.

The new legislation aimed at was that doubling present registration fees and increasing them three and five-fold in trucks; and that giving the secretary of state power to revoke licenses at will with hearings or not, as desired. The bills arranging for owners and chauffeurs to have to give bonds before being registered were also the center of attack. Three years ago, when the Callan bill was made the law of this state, the motorists only consented to a registration charge to defray the cost of identification and secure a rational operating law. It practically was a gentleman's agreement, and now when the government aims at doubling the fees without any reason other than getting more revenue it is looked upon as a breach of faith by the motorists. They threw the gauntlet down publicly, declaring that if fees are raised the constitutionality of the present registration law will be carried to the highest courts, and in the meantime all registrations will be paid under protest.

AGAINST CONNECTICUT BILLS

Hartford, Conn., March 17—Connecticut motorists are optimistic at present. They have cause to be. Opposition to the present satisfactory law was handed a telling punch this week when the committee on roads, rivers and bridges reported unfavorably on a number of proposed amendments which it was assumed could but have a deleterious effect.

The committee has given bearings on these various bills. The motoring fraternity turned out in big numbers and had a lot to say. The best people of the state, legal lights, eminent business men, former state officials, all have had something to say. The new secretary of state was frank in his objection to the proposed measures. "Let well enough alone" has become the state slogan.

The committee on roads, rivers and bridges, to which was referred each pro-

posed amendment to the present law, reported unfavorably in the house on the speed provision. This is a very significant omen.

An act aiming to restrain heavy vehicles from the use of the highways, which would put a damper on the use of heavy trucks, proved unfavorable with the committee, which so reported in the house. This report was accepted, which doubtless implies that the issue is now dead and past resurrection.

A favorable report on a bill prohibiting the use of signals other than bulb horns was reported unfavorably by the committee and the report accepted. Passage of such a measure would be a big blow to the Nutmeg accessory trade. Obviously it concerns every manufacturer of signals through the country.

An unfavorable report was handed in by the committee on a bill concerning travel on the highways. Mr. Thoms, of Waterbury, considered it an important measure. It was ordered tabled for calendar and printing. Mr. MacDonald, of Putnam, said the issue was covered by statute and town ordinances.

Mr. Magee, of Watertown, said that the bill was not worth printing and referred to school house whether occupied or not. It has to do with speed of travel when passing school houses. Mr. Hall, of New Milford, thought the measure fair. He did not think that it was a hardship on the motorists to ask them to reduce speed to safeguard life. Mr. Thoms called attention to the number of school children in daily danger. He had an idea that the present law does not safeguard pedestrians. A motion to reconsider the bill was lost.

ILLINOIS' GOOD PROSPECTS

Bloomington, Ill., March 17—Prosperity exudes from every pore of central Illinois, according to motor car dealers in this section of the state, and a record season is anticipated in relation to the sale of cars.

Although the weather man appears to be crowding 4 months of winter into one, the last month before spring has been marked by many sales and an unusual number of prospects. A majority of the inquirers are farmers. With grain prices ruling strong and the quotations on hogs and cattle soaring, the men who till the soil and raise the stock, have reason to feel contented and affluent. This feeling prevails to an apparently unanimous degree in central Illinois, and the dealers in motor cars need concern themselves only with securing the cars. The farmers will take them off their hands.

Satisfied that this diagnosis of trade conditions is correct, the dealers now are trying to secure cars sufficient to supply the demand while the demand is on. The feeling is prevalent that hundreds of prospects who delay placing their order, will be disappointed, due to the inability of

the manufacturers to supply the demand.

While this shortage will not apply to the higher-priced cars, yet it is believed to be certain that the medium-priced cars will be far short of the demand. All reports received by the central Illinois dealers tell the same story and strenuous efforts are being made to secure as many cars as possible during the present month.

It is a remarkable fact that McLean county, ranking with the richest in the state outside of Cook, is not buying cars costing above \$2,000. Even the millionaires to whom a few thousand is practically nothing are passing by the de luxe cars, and instead taking, in the majority of instances, cars that they can secure for \$1,500. It is an absolute fact that in the past year in McLean county not to exceed ten gasoline cars were purchased which cost more than \$2,000, while one-fourth averaged \$700 and one-half averaged \$1,100, the remainder averaging about \$1,500.

It is hoped by the dealers who handle the higher-priced cars that buyers who find that they cannot secure the lower-priced type will add a few hundred and take a higher-priced car rather than wait another year. Whether or not this hope will be realized, only the developments of the next 2 months will determine.

PROGRESS OF QUAKER TEST

Philadelphia, Pa., March 15—The first week of the sealed bonnet road-conditioning test being conducted by the touring bureau of the Automobile Club of Philadelphia was completed today and gives promise of being productive of more accurate information than anything heretofore attempted in that line.

During the week a total of approximately 1,225 miles has been covered, a daily mileage of 175. Information invaluable to motorists as to the condition of roads to numerous towns and cities has been accumulated, as well as new routes.

Following is the first 7 days' itinerary of the Multiplex car being driven by George B. Trem:

Saturday—Philadelphia to Reading, to Harrisburg; return by way of Elizabethtown, Lancaster, Coatesville, 210 miles.

Sunday—Philadelphia, Doylestown, Hintnersville, Easton; return, Nazareth, Bethlehem, Allentown, Reading, Pottstown, Collegeville, 165 miles.

Monday—Philadelphia to Cape May, N. J., and return, by way of Camden, Glassboro, Malaga, Mays Landing, 187 miles.

Tuesday—Philadelphia to Lakewood, N. J., passing through Camden, Mount Holly, New Egypt; return, via Freehold, Trenton, Bordentown, Camden, 185 miles.

Wednesday—Philadelphia to Allentown, via Zellersville, Centre Valley, Slatington, Schwenkville; return via Collegeville, Germantown and Perkiomen pike, 167 miles.

Thursday—Route mapped to Morristown, N. J., but wretched conditions were encountered, which prevented a full run being completed in a day, 160 miles.

Friday—Car covered 151 miles investigating new roads between Philadelphia and Reading.

BENJAMIN ALCO SALES MANAGER

New York, March 19—Special telegram—C. Arthur Benjamin has been appointed Harry Houp's successor as Alco sales manager. Mr. Benjamin formerly handled Packard and Hudson cars in Syracuse.

Idaho Qualifies as Good Roads State

Koelsch and Shattuck Bills Pass Legislature—Registration Tax Imposed and Provision Made for Convict Labor on Highways, Following Montana's Example

BOISE, Idaho, March 15—On the very last day of the legislative session Idaho came into its rightful heritage as a good roads state, and it is now entitled to take its place among the truly progressive states of the union. Among the things done by the senate on the last day of the meeting was the passage of the Koelsch and Shattuck bills, as the two good roads measures were called.

The Koelsch bill provides for the creation of a state highway commission; a special tax on motor vehicles, and for convict labor on the highways. The highway commissioners will receive no pay except necessary expenses, and the commission will have entire jurisdiction over the highways of the state. This division of the bill is modeled largely after the uniform highway law which is being adopted in all the states as rapidly as they can get to it. It looks toward a national system of roads.

A special tax is assessed on motor vehicles as follows: Under 30 horsepower, \$20; 31 to 40 horsepower, inclusive, \$25; 41 to 50 horsepower, inclusive, \$30; above 50 horsepower, \$40. All moneys raised from this tax and from registrations and fines will go into the road fund and will be used for no other purpose.

The third division provides for working convicts on the roads, largely following the plan pursued in Colorado. The minor details of the bill are similar to the uniform motor vehicle law.

The Shattuck bill provides for the issuance of \$200,000 state bonds, the money to be used in laying out, surveying and constructing a system of state highways. The moneys collected under the provisions of the Koelsch law will be expended as follows: Thirty per cent shall be applied to the payment of the principal and interest upon the bonds issued by the state for the construction of state highways; the remaining 70 per cent shall be returned to the several counties of the state from which collected, provided such counties shall require the same for the payment of interest upon bonds issued by them in aid of the construction of county highways. Not more than 70 per cent of the money collected in any county shall be returned to such county in any event, and if the whole of such 70 per cent is not required for the payment of the interest, then only such part thereof as may be required shall be returned. All unclaimed portions of the 70 per cent shall be placed with and used as is the money constituting the 30 per cent. The provisions of this law will encourage both the state and counties to authorize bond issues for highway purposes.

A joint senate memorial was introduced by Hart, requesting congress to transfer 50,000 acres of timbered land now held within the national forests by the United States within the boundaries of Idaho for the purpose of creating a fund to be used by the state for the establishment and maintenance in good repair of a system of public roads within the borders of the state.

OHIO HOLDS ROAD CONGRESS

Columbus, O., March 15—One of the most enthusiastic good roads congresses ever held closed its sessions at Columbus yesterday, after hearing a number of talks by experts in road-building. The congress, which was called the good roads and rural life congress, was attended by thousands of representatives from all parts of the state of Ohio and was an unique gathering. Governor Cox is responsible to

a large degree for the success of the congress because of the interest taken by him in its arrangements.

Before adjourning the congress suggested that the governor name a commission with authority to make a complete rural survey of the state. The congress declared in favor of the appointment of a codifying commission to codify all of the road laws of Ohio. The congress endorsed the plan to levy a tax of 1 mill in excess of all other taxation for the improvement of the roads of the state.

OHIO WANTS LARGER FEES

Columbus, O., March 15—Representative M. A. Warnes, of Holmes county, has introduced a bill in the Ohio general assembly providing for a sliding scale in assessing fees for the registration of motor cars and motorcycles in Ohio. The bill supersedes the one which was introduced in the legislature at an earlier date but withdrawn because it was believed to be unconstitutional. Fees ranging from \$5 to \$25 are fixed for the various horsepower cars, while motorcycles are assessed \$3 each. The motor car rates are: Under 20 horsepower, \$5; 20 to 30, \$10; 30 to 40, \$15; 40 to 50, \$20; over 50, \$25. Manufacturers' and dealers' licenses will cost \$25 and electricies will be charged \$5.

The bill provides that the law is to become effective January 1, 1914, and it is presumed that all licenses taken out before the bill becomes a law will be good for the present year. Licenses taken out after the enactment of the law will be graded on the new schedule. The proceeds from the issuing of licenses are to go to the improvement and repair of public highways.

A bill has been introduced in the general assembly by Senator Deaton providing that when a vehicle passes another going in the same direction the rear driver must give warning and the driver of the first vehicle must give half of the road by turning to the right.

FEDERAL AID PROGRESS

Washington, D. C., March 15—Following the adoption of a resolution of the federal aid good roads' convention of the American Automobile Association asking congress to create a standing committee on national roads, Congressman Slep, of Virginia, has launched a campaign to this end. He is urging democratic leaders in congress to split the house committee on postoffices and post roads into two committees, giving one charge of postoffice affairs and the other that of post roads.

Routes and Touring



LINVALLE, AS SEEN FROM DONALD'S CRAG. SOME OF THE MAGNIFICENT SCENERY

Attractions of the Crest of the Blue Ridge Highway

THERE is in the southeastern part of the United States a section of country that is unrivalled or unsurpassed in its scenic attractions, its climate and its pure water; and this region is soon to become one of the chief attractions of this country. This wonderfully attractive section of country is in the southern Appalachian mountains, embracing portions of North Carolina, Virginia, Tennessee and Georgia and contains the loftiest mountain peaks east of the Rocky mountains, with mountain slopes covered with a more varied fauna and flora than is found in any other section of the United States.

Speaking of the forests of the southern Appalachian mountains, the Scientific American says:

Within a day's travel of New York, Philadelphia, Baltimore, Washington, and most of the Atlantic seaboard, and quite as accessible to Pittsburgh, Cincinnati, Louisville, Indianapolis, St. Louis, there are vast stretches of virgin forests that are thoroughly suited to a great forest reserve. The late Professor Gray, the eminent botanist of Harvard, tells us that he encountered a greater number of species of indigenous trees than could be observed in a trip from Turkey to England through Europe, or from the Atlantic coast to the Rocky mountain plateau. The region surrounding that described by

**By Joseph Hyde Pratt,
State Geologist**

Editor's Note—The photograph used in illustrating the Blue Ridge Highway article were taken by Herbert W. Peyton and are copyrighted.

Professor Gray, especially with the headwaters of the Tennessee and the French Broad, is an ideal spot for a reserve where every sort of North American animal or fish would thrive, and where almost every tree or plant found within our borders, from the Atlantic to the Pacific, would grow uncared for.

In commenting on this section of country embraced by the southern Appalachian mountains, the Hartford, Conn., Courant says:

The wildest and most naturally beautiful part of this country east of the Rocky mountains is that region where North Carolina, Tennessee, Virginia, South Carolina, and Georgia approach each other. The tallest mountain east of the Rockies is in North Carolina.

Better Transportation Needed

The principal reason why this grand section of our country is not better known and more extensively visited is a lack of means of transportation. It is true that several railroads penetrate these mountains, but it is necessary to have good

public roads leading from these railways into all parts of this mountain region before it will become accessible and attractive to sightseers, pleasure-seekers and others.

In order to remedy this defect, a gigantic plan has been worked out for the construction of a system of improved highways through the southern Appalachian mountains and the Southern Appalachian Good Roads Association has been organized, whose sole purpose is to see that this is accomplished—and it is being accomplished.

Fine Highway Planned

The pioneers in this work believed that the construction of a highway through the heart of this mountain region and near the summit of the mountain ranges would do more to attract attention to this section of the country and give quicker results in good road construction than anything else. Thus was born the idea of the crest of the Blue Ridge highway, to extend from Virginia to Georgia.

This highway is now being constructed, and when completed will rival all other highways in this country for rugged location and scenic beauty.

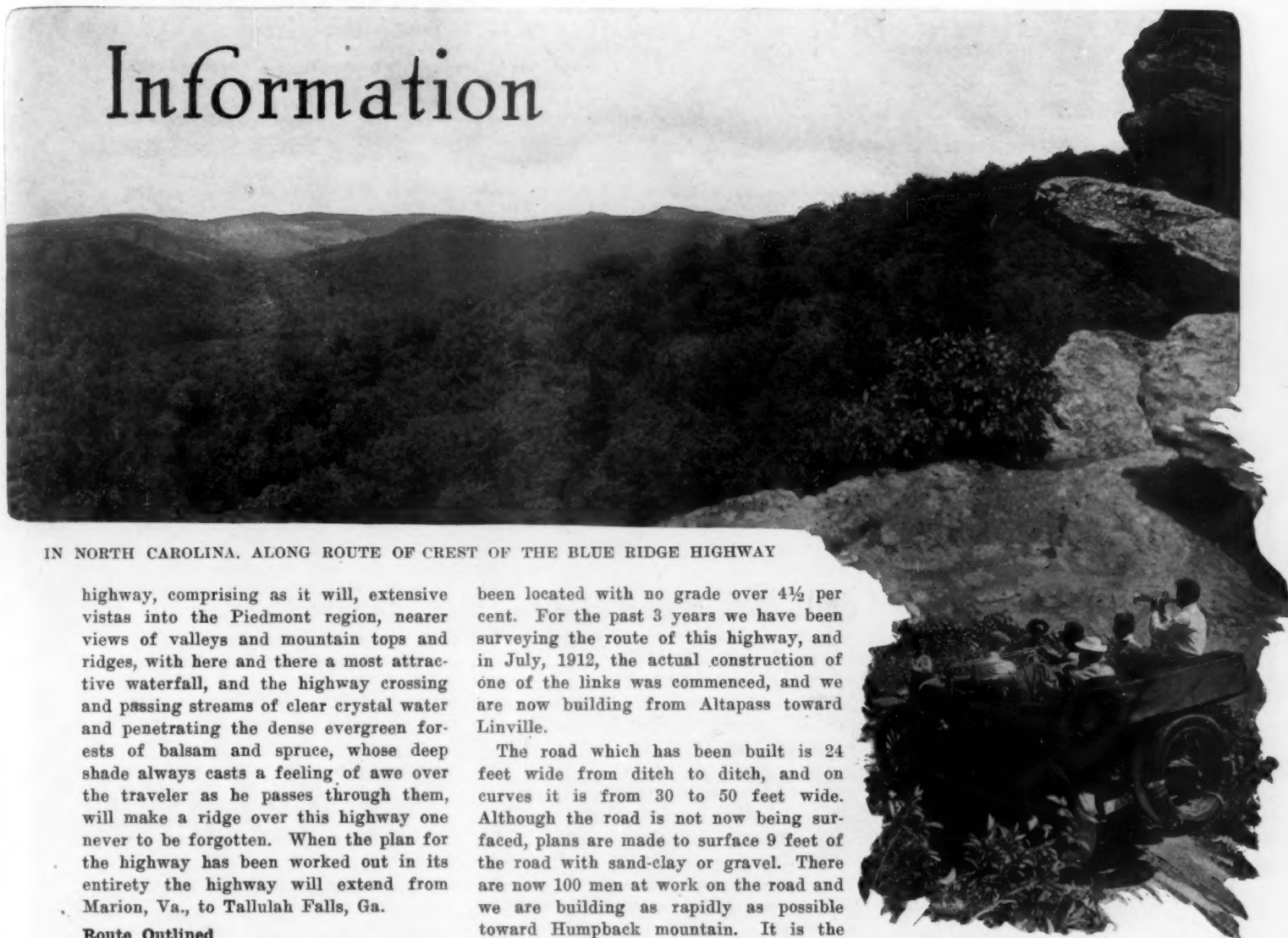
Although roads built primarily for scenic purposes and for the use of the tourist are common in many countries of Europe, they have not been built to any great extent in this country, and none thus far has been constructed in the southern Appalachian region. The scenic beauty of this highway will be its most noteworthy single feature, for the section of the southern Appalachian mountains through which the Crest of the Blue Ridge highway will pass contains the highest and most rugged mountain ranges in the eastern United States.

The grandeur of the scenery along this



ON MT. MITCHELL, AT ELEVATION OF 6,711 FEET

Information



IN NORTH CAROLINA. ALONG ROUTE OF CREST OF THE BLUE RIDGE HIGHWAY

highway, comprising as it will, extensive vistas into the Piedmont region, nearer views of valleys and mountain tops and ridges, with here and there a most attractive waterfall, and the highway crossing and passing streams of clear crystal water and penetrating the dense evergreen forests of balsam and spruce, whose deep shade always casts a feeling of awe over the traveler as he passes through them, will make a ridge over this highway one never to be forgotten. When the plan for the highway has been worked out in its entirety the highway will extend from Marion, Va., to Tallulah Falls, Ga.

Route Outlined

Stepps' gap, with an altitude of approximately 6,000 feet, where the highway will be within 800 feet of the top of Mount Mitchell, the highest peak east of the Rockies.

On account of the character of the country through which part of this highway passes and its scanty population, it will be necessary to build a considerable portion of it by private subscription, and so instead of being a public road it will have to be for the time being a toll road. This portion of the road lies between Boone and Asheville, N. C., a distance of about 130 miles. From Boone to Linville, a distance of 32 miles, there already is a toll road which will become part of the Crest of the Blue Ridge highway.

From Linville to Asheville the location of the road has been surveyed and there is no grade on it over $4\frac{1}{2}$ per cent. The Blue Ridge is crossed and recrossed so that the highway sometimes is on one side and then on the other, but keeping as nearly as possible to the higher portion of the mountains.

The highway passes through the Black, Balsam and Craggy mountains; and although this portion of the highway offers some very heavy work, the road has

been located with no grade over $4\frac{1}{2}$ per cent. For the past 3 years we have been surveying the route of this highway, and in July, 1912, the actual construction of one of the links was commenced, and we are now building from Altapass toward Linville.

The road which has been built is 24 feet wide from ditch to ditch, and on curves it is from 30 to 50 feet wide. Although the road is not now being surfaced, plans are made to surface 9 feet of the road with sand-clay or gravel. There are now 100 men at work on the road and we are building as rapidly as possible toward Humpback mountain. It is the desire of the Appalachian Highway Co., which has been chartered to build this highway, to have open by next summer the portion of the highway from Little Switzerland to Linville via Altapass. By doing this we will open up for travel, suitable for motor cars, more than 50 miles of road, with a fairly good connection at Blowing Rock with a highway leading to Lenoir and the Piedmont section of North Carolina.

South Carolina Interested

Although the road from Boone to Asheville will not be a public highway, but a toll road, we are getting all the people along the line interested in the highway. They are giving us rights-of-way and also making subscriptions to the stock of the company. When the work was started 3 years ago to make a survey for a route of the highway there were only a few of us who were sanguine as to the building of the highway; and there were not many who had very strong expectations that work would actually begin on the construction of the highway at a very early date.

Although, as I have stated before, there will be a great deal of heavy work on this highway through the Black, Balsam and

Craggy mountains, on account of the amount of solid rock that will be encountered, yet even if the road costs as high as \$10,000 or \$12,000 per mile for certain sections, it will pay to build it. It will open up a section of country, the scenery of which is equal to any in the world, and it will attract tourists in such numbers that the amount of money brought into the country by reason of the road will in a very short time more than pay for the actual construction of the highway.

The construction of the highway has been started and we do not expect to stop until it has been built right through the heart of the mountains of western North Carolina, on into Georgia and into Virginia, with connecting roads leading from various points into the Piedmont sections of Virginia, North Carolina, South Carolina, Georgia and Tennessee. It probably is one of the largest road propositions ever undertaken in the south, or even in the United States. But the plan is feasible. It is started. It is going to be completed. And we are going to be proud of the Crest of the Blue Ridge highway when it is completed.

Answers to Readers of Motor Age Regarding Routes

WOONSOCKET, S. D.—CHICAGO

WOONSOCKET, S. D.—Editor Motor Age—I desire to motor to Chicago next month, and would like the routing.—R. E. Stevens.

The best routing would take you to Mitchell, Emery, Bridgewater and Sioux Falls, being a distance of 108 miles, then 87 miles to Worthing, Beresford, Elk Point and Jefferson to Sioux City.

Here either the Iowa transcontinental can be traversed, leaving Iowa at Clinton, or you can take the Hawkeye highway and leave the state at Dubuque. A natural dirt road of 136 miles extends through Lawton, Merville, Correctionville, Holstein, Galva, Shaller, Early, Sac City, Rockwell City, and Moorland to Fort Dodge, starting off on the Iowa Hawkeye highway. The next stretch lands you in Waterloo after traveling 111 miles through Webster City, Blairsburg, Williams, Wilkie, Alden, Iowa Falls, Ackley, Arlington, Parkersburg, New Hart-

Jordan, Ames and State Center, which is 142 miles. Going 166 miles you will arrive in Clinton, passing through Le Grand, Montour, Tama, Gladstone, Belle Plaine, Cedar Rapids, Marion, Mt. Vernon, Mechanicsville, Clarence, Lowden, Wheatland, Grand Mound, De Witt and Elvira.

The last stretch into Chicago is 148 miles, and gravel roads prevail mostly through Lyons, Fulton, Morrison, Sterling, Dixon, Franklin Grove, Ashton, Rochelle, Creston, De Kalb, Geneva, Lombard, Elmhurst, Maywood and Chicago.

Running directions can be found in the Blue Book, volume 5, for the coming and going trip, barring that stretch from Woonsocket to Mitchell, which no doubt you know.

TO CROSS CONTINENT

Toppenish, Wash.—Editor Motor Age—I should like to know where I can get a supply of road maps and all information one needs for a trip in a motor car across the conti-

nent. I want to leave North Yakima, Wash., the middle of April and go through Wallace, Ida., and through Montana, North Dakota, Minnesota and down through Wisconsin to Chicago, then to Decatur, Ill. I should like to have this routing.

Where can I get maps showing the good roads all over the United States? I want to return by way of New Mexico and California, then up the coast to Seattle.

Where can I get a light camping outfit which is easy to carry in a car and also advise what it should consist of. I am going on a pleasure trip with my wife and two children and want to have the camping outfit needed to enjoy the trip. We want to be able to cook our meals and stretch our tent wherever night overtakes us. C. H. Frailey.

You will not find any book giving running directions on your going trip until you reach Grand Forks, N. D. From that city to Minneapolis the Blue Book 5 will answer the purpose, the number 4 to Decatur and Keokuk, Ia., then the number 5 for your return trip by the southern route to San Francisco, although there are quite a few stretches where it is best to take other roads. A map giving the main arteries of the states was published in the issue of March 13, and if this will not serve the purpose you will have to write to each state highway commissioner for a map of the state roads.

The best road to Spokane would be through Ellensburg, Wenatchee, Waterville, Goulee City, Almira, Wilbur, Creston, Davenport, Mondovi and Deepcreek. Cars are most always shipped to Missoula, but it can be made by motor car if taken slowly. At Helena you can take a side trip to Livingston and the Yellowstone park, returning to Helena and routing through Great Falls, Havre, Wolf Point, Buford, Minot, Devil's Lake and Grand Forks. This northern route is very uncertain. New settlers are constantly laying out claims and in many instances you will find the road, more properly called a trail, inside the fences. This means following the fence until you find the road again.



PICTURESQUE PART OF BLUE RIDGE HIGHWAY

ford and Cedar Falls. With the exception of the last few miles going into Dubuque you have a level 91-mile journey through Jessup, Independence, Winthrop, Manchester, Earlville, Dyersville, Epworth, Centralia, Julien and Dubuque.

Chicago finally is reached after a distance of 183 miles by way of Fairplay, Wis., Hazel Green, Benton, Shullsburg, Warren, Ill., Wadham, Freeport, Rockford, Cherry Valley, Belvidere, Marengo, Harmony, McQueens, Elgin, Ontarioville, Bloomingdale, Addison, Oak Park and Garfield Park. Dubuque to Warren is over very hilly country, and it is necessary to be on your guard for rough grades with water bars.

To reach the Iowa transcontinental road from Sioux Falls you take the road towards Holly Springs and go through Smithland, Mapleton, Ute, and Charter Oak to Denison, being 82 miles, from whence you reach Marshalltown over this well-known road through Vail, Arcadia, Carroll, Gilden, Scranton, Jefferson, Grand Junction, Ogden, Boone,



GROVE MOTOR ROAD NEAR ASHEVILLE, N. C., ON BLUE RIDGE HIGHWAY

Grand Forks to Minneapolis is 360 miles, passing through Merrifield, Thompson, Reynolds, Hillsboro, Mapleton, Fargo, Barnesville, Rothsay, Fergus Falls, Melby, Evansville, Garfield, Alexandria, Sauk Center, Melrose, Freeport, Albany, Avon, St. Joe, St. Cloud, Clear Lake, Becker, Elk River, Dayton, Anoka, Osseo, Crystal Lake.

The main road to Chicago is 472 miles, running through Lakeland, Hudson, Hammond, Baldwin, Wilson, Knapp, Menomonie, Eau Claire, Brackets, Whitehall, Galesville, Holman, La Crosse, St. Joseph, Portland, Cash-ton, Kendalls, Elroy, Union Center, Wone-woc, Reedsburg, Abelmans, Baraboo, Sauk City, Ashton, Madison, McFarland, Staunton, Edgerton, Janesville, Emerald Grove, Delavan, Lake Geneva, Genoa Junction, McHenry, Volo, Diamond Lake, Half Day, Highland Park, Glencoe, Kenilworth, Wilmette, Evanston, Chicago.

The road to Decatur, 195 miles, is gravel and macadam by way of La Grange, Joliet, Minooka, Morris, Dwight, Odell, Pontiac, Chenoa, Lexington, Towanda, Bloomington, Heyworth, Wapella, Clinton, Maroa.

For your return trip go to Springfield, Ill., Keokuk, Ia., Centerville, Mt. Ayr, St. Joseph, Mo., Kansas City, Emporia, Kans., Newton, Great Bend, Dodge City, Leberal, Texhoma, Okla., Amarillo, Tex., Brownsville, Almagordo, N. M., El Paso, Tex., Lordsburg, Douglas, Ariz., Phoenix, Yuma, El Centro, Cal., San Diego, Los Angeles, San Miguel, San Jose, San Francisco.

David T. Abercrombie & Co., of New York, carry a most complete line of camp outfits and supplies, and we would advise that you write them for a catalog. A tent which seems to be attracting considerable attention is one made by the Compac Tent Co., Indianapolis, which folds up into a package 7 by 20 inches. A bed is included on the built-in floor principle.

It is not necessary to have a tent at all. A much cheaper plan is suggested by a Motor Age reader. He had the back of the front seats hinged so that it would lay flat and together with the back seats this formed a double bed. A thin mattress was then made to fit, and with the top up, the side curtains down if desired, one could not find a better bed. For this plan Motor Age would sug-

gest a tarpaulin large enough to extend about 3 feet beyond the car on three sides and about 6 or 8 on the other to provide for the cooking outfit. This cover could be stretched over the car and held up by jointed tent poles. If the weather is favorable it need not be put up at all.

A stretcher bed, or folding camp bed can be secured if you do not want to have the remodeling as suggested. The stretcher bed is a piece of canvas 6 by 3 feet, with pockets on the sides for poles, which are rested on four stakes driven in the ground at the corners. It weighs 3 pounds. The camp bed is a cot which folds up into a package 3 feet long, 4 inches thick and 5 inches wide and weighs 15 pounds.

Last summer one motorist took the top of a three-burner gasoline stove on his trip and attached a rubber hose to the drain cock on the carburetor. If the carburetor on your motor does not happen to have a drain cock you can detach the gasoline lead from it and put the hose on the lead. When a camp fire was necessary, this same motorist used his skid chains to stretch over it to hold the

pots and pans. Electric lights can also be had by attaching an extension cord to the acetylene tank.

In the succeeding issues of Motor Age articles on the market for the camping motorist will be illustrated and described. Many of them are not necessities, but an aid to comfort.

OHIO TO MAMMOTH CAVE

Chicago Junction, O.—Editor Motor Age—Kindly give me a routing to Mammoth Cave, Ky., going via Louisville and returning via Lexington, Georgetown, etc. Will the roads be suitable for this trip by the last of May?—Subscriber.

Route 27 miles to Bucyrus, through Attica, Caroline, Carothers, Chatfield, then towards Cincinnati, making a selection of the following two routes both in the Blue Book with running directions. The road conditions are about the same, but the longer by way of Columbus will be found more attractive. The short-cut is 158 miles, including the towns of Marion, Prospect, Marysville, Mechanicsburg, New Moorefield, Springfield, Enon, Fairfield, Harsh-



TYPICAL STRETCH OF BLUE RIDGE
HIGHWAY NEAR ASHEVILLE, N. C.



BLUE RIDGE HIGHWAY HAS MANY SCENIC BEAUTIES

man, Dayton, Centerville, Ridgeville, Lebanon, Mason, Sharon, Cincinnati.

It is about ten to one that you will not finish your trip to Nashville in your motor car—the nearer you get the worse the road becomes. To Louisville, 135 miles, the roads along the like road are Lawrenceburg, Aurora, Aberdeen, Vevay, Carrollton, New Castle, Shelbyville, St. Mathews, and on to Mammoth Cave, 116 miles, Mount Washington, Bardstown, New Haven, Buffalo, Canmer, Bear Wal-low and Cave City.

Returning to Bardstown, then by way of Lexington to Cincinnati it is 162 miles, and the itinerary Botland, Frederickstown, Springfield, Texas, Perryville, Danville, Harrodsburg, Shakerstown, Lexington, Georgetown, Corinth, Williamstown, Dry Ridge, Crittenden, Walton, Florence, Covington. The longer route, which we mentioned above, by way of Columbus, is 186 miles to Bucyrus and the towns of Montgomery, Morrow, Wilmington, Washington Court House, Williamsport, Circleville, Bloomfield, Columbus, Worthington, Delaware and Marion.

Bellem Engine Starts Cold on Kerosene

French Design Utilizes Cheap Fuel

In view of the present agitation for cheaper fuels for motor cars, the Bellem motor, described and illustrated on these pages, is timely. This is a motor of the ordinary four-cycle type, weighing no more than the ordinary motor car engine but capable of starting cold and running on kerosene, or, after being warmed, of running on crude oil. It is peculiar in that there is no carbureter, but a special atomizer is used, operated by the suction of the engine. Licenses for the construction and use of the engine, which is the invention of M. Bellem, a French engineer, have been granted to the maker of the Delaunay-Belleville and other engine factories in France.

A FOUR-CYCLE motor capable of starting up cold on kerosene, of running on any kind of crude oil, weighing no more than a motor car engine, having a normal compression, having no carbureter and using no compressed air, has been produced by M. Bellem, a French engineer. This motor has passed beyond the experimental stage, for, it is claimed, licenses to construct have been secured by Delaunay-Belleville and the Sautter & Harlé, a French firm employed largely on army and navy work. The similarity between the standard type of car motor running on gasoline and the Bellem consuming kerosene or crude oils, is found in the fact that the former can readily be converted to the latter. Most of the experimental work has been done on motors so converted.

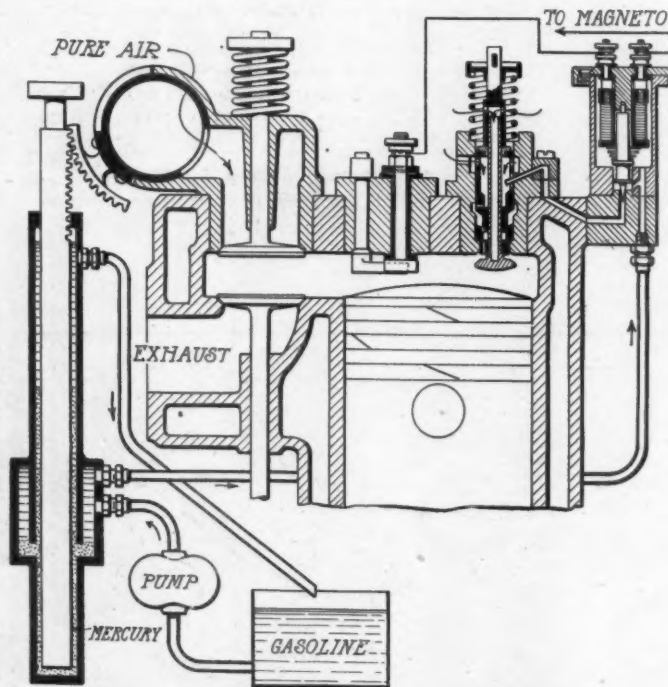


FIG. 1—DIAGRAMMATIC ARRANGEMENT OF BELLEM'S MOTOR ARRANGED TO RUN ON GASOLINE, COAL OIL OR CRUDE OIL

by a constant circulation of water from the mains. After running for 5 minutes on kerosene, this fuel was shut off and crude oil allowed to flow. No difference could be detected in the running of the motor and the exhaust was perfectly clear. Speed variations were obtained from 200 revolutions per minute, running light to 1,200 under load. Varying the speed as quickly as possible by use of the throttle and ignition cutout, it was impossible to get anything more than a slight puff at the exhaust; this puff lasted but a fraction of a second and had nothing that indicated incorrect mixture.

The secret of the invention lies in the complete pulverization of the fuel in a partial vacuum. Experiments have shown that if the same atomizer is used in a chamber at atmospheric pressure and

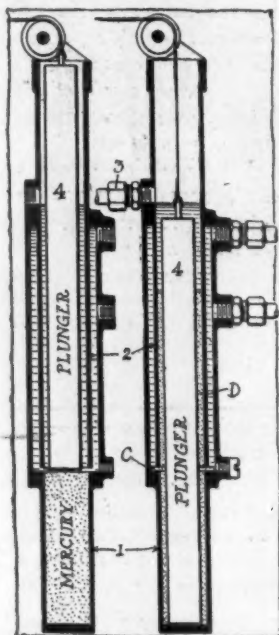


FIG. 2—MERCURY PRESSURE REGULATOR WHICH IS EMPLOYED ON THE FRENCH BELLEM MOTOR

On the Bellem there are the usual mechanically operated intake and exhaust valves, but the former, instead of admitting gas, allows pure air to pass through and does not open until 30 degrees before lower dead center. It closes about 30 degrees after low dead center. The exhaust valve has the usual timing. In the head of the cylinder is fitted a combined automatic intake valve and atomizer. With the main valves closed, there is considerable depression in the cylinder during the first portion of the intake stroke. The suction of the piston opens the automatic valve shown in detail in Fig. 4. A charge of fuel having been brought up to this valve under pressure, the liquid and at the same time a certain quantity of air are brought in from A to B, through the holes B1 and then through B2. Finally, pure air is drawn through the hollow stem of the valve and the holes B3, completely atomizing the fuel.

Obtains Cold Vapor of Kerosene

Strong claims are made for this type of atomizer working in a partial vacuum. In the presence of the writer a stone-cold single-cylinder demonstration model was cranked by hand with the ignition cut off. At each exhaust stroke a puff of vapor came through the port, and on a mirror being held before it not a trace of condensation was to be seen. The inventor claims that he obtains cold vapors. A demonstration of this is to place a metal tube near the exhaust, heat it by a soldering lamp, and drop kerosene onto the hot tube.

At the time the cold motor is cranked by hand, when the vapors coming out of the exhaust port are indistinguishable from those obtained by burning kerosene on the hot tube. The demonstration motor, after standing all night, had cold water from the city mains run into its jacket and was started on the first pull of the handle against compression. This was repeated several times after the cylinder walls had been allowed to cool

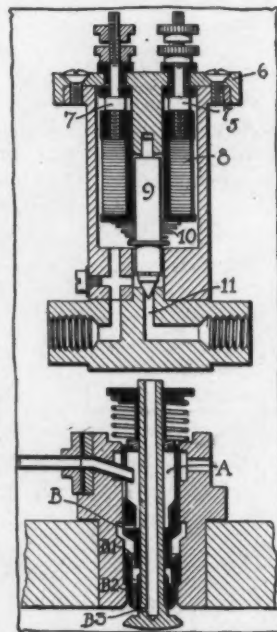


FIG. 3—MAGNETIC DISTRIBUTOR
FIG. 4—AUTOMATIC VALVE

with compressed air passing through the valve, the results are not the same, there being a certain amount of condensation. It is claimed that the late opening of the main air valve does not prevent a complete filling of the cylinder.

Operation of Engine

The fuel, as already explained, is delivered under pressure to the vaporizer. This necessitates the use of two distinct organs, a pressure regulator and a distributor. The pressure regulator is shown separately in Fig. 2. It is fed from a kerosene tank by means of any suitable type of pump, and consists of a metal vessel 1 containing mercury, and welded to it, a metal tube the lower end of which is level with the top of the mercury. In the tube is a plunger 4 capable of being raised and lowered in any convenient manner, and, according to its position, varying the height of the column of mercury *d* in the tube 2. The height of the column of mercury determined the pressure of kerosene in the chamber *c*. The excess of fuel passes through the mercury column and down the overflow pipe 3 to the tank. The feed pump has a capacity slightly greater than that of the motor under full power. The amount of fuel flowing through the return pipe with the motor under power is insignificant and there is no danger of the mercury being carried through with the fuel. The plunger is connected up to the air valve, thus a single operation, controlled either by governor or by hand, determines the pressure of fuel to the distributor and the amount of air admitted.

It will be noted that the feed pipe connects the pressure chamber with the distributor placed to the right of the automatic valve. This distributor is shown separately in Fig. 3. The pressure being variable at will, the distributor is not called upon to regulate the quantity of fuel in any way. Its opening has to be constant and independent of the motor speed. It will be understood readily that an opening which allowed the correct amount of fuel to pass at 1,000 revolutions would be too great at 500 revolutions if a mechanical control was employed.

With a mechanically operated valve also, there would be a possibility of the motor stopping with the valve open, when the fuel would continue to flow until pressure had fallen off. The control, therefore, is magnetic, the apparatus comprising a soft iron core 5 with a cover 6 to which is attached the coil 8 by means of the insulated terminals 7. In the center of the

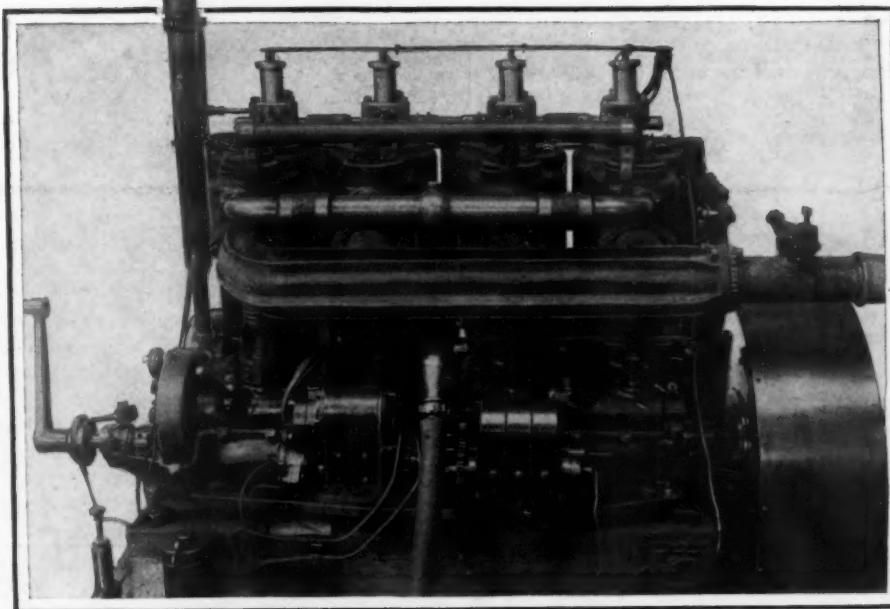


FIG. 5—FOUR-CYLINDER MOTOR CAR ENGINE CONVERTED BY BELLEM TO RUN ON KEROSENE AND CRUDE OIL

coil is a needle valve 9 maintained on its seat by the coil spring 10. At the moment of breaking contact on a low-tension magneto, the needle valve is raised off its seat and the fuel under pressure in the feed pipe passes through *e* to the atomizer. The opening of the valve is practically instantaneous and its length of opening depends on the weight of the needle valve and the strength of the spring. The length of opening obviously is constant whatever the speed of the motor.

In the drawings the motor is shown with low-tension ignition. All the experimental models, however, have been fitted with an ordinary type of high-tension magneto for the ignition and a low-tension magneto for supplying the current to the magnetic distributor. The compression of the charge, firing, and exhaust, are carried out as on a normal type of four-cycle motor. When motors have been converted the compression has not varied and is between 60 and 70 pounds per square inch.

Tested by French Club

A test of one of these motors carried out at the laboratory of the Automobile Club of France is given herewith. The motor was a single-cylinder vertical of 100 by 150 mm.—3.9 by 5.9 inches—bore and stroke. The compression was 71 pounds per square inch.



FIG. 6—DEMONSTRATION MODEL OF BELLEM MOTOR RUNNING ON KEROSENE

It is worthy of note that the ordinary single-cylinder gasoline motor of this bore and stroke can be expected to give 5.2 horsepower at 820 revolutions per minute, which is the same as obtained from the Bellem motor on kerosene. The gasoline consumption of a motor of this size is about 0.107 gallons per horsepower hour.

In this test the motor was started cold with the use of kerosene only. The first test lasted 2 hours, the second test 1 hour, and the third 1 hour. Acceleration from under load was particularly easy.

TEST OF BELLEM MOTOR ON THREE FUELS

Revolutions Per Minute.	Brake H. P.	Gallons Per H. P. Hour.	Observations.
			Fuel, Kerosene—Test Lasted 2 Hours
820.0	5.2	0.125	
813.0	5.1		
811.5	5.0		Fuel, Alcohol—Test Lasted 1 Hour
811.7	5.0		
773.0	5.1	0.258	Fuel, Crude Oil—Test Lasted 1 Hour
760.0	4.3	0.111	

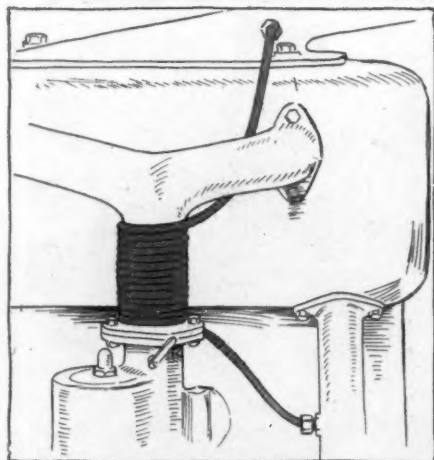


FIG. 1—HOT WATER JACKET FOR MANIFOLD

ALIGNING FRONT WHEELS OF CAR Excessive Wear of Forward Tires Due to Faulty Adjustment

EL PASO, TEX.—Editor Motor Age—Do the front tires usually wear out the treads faster than the rear ones? Mine appear to wear nearly twice as fast as the rear, and more especially the right front one. I have measured the distance between the treads directly in front of the axle, and at the ground, as per Motor Age's instructions, and the treads of the front wheels are the same distance apart at these two points. I have tested the camber with a carpenter's square on the floor, and the camber is the same in both front wheels. Have jacked up the wheels and spun them around; they run almost exactly true.

2—Is it because the right front wheel is usually running on the lower side of the road, due to driving to the right, that the tire wear is greater than on the left front tire?—J. T. Gilroy.

1—The wear of tires is in the great majority of cases greater on the rear wheels than on the front. This is the normal condition because of the fact that the car is designed with more weight over the rear tires than over the front ones, and because the rear tires must bear in addition to greater weight than the front tires, the driving and braking stresses. In a properly designed car this is always the case, although it is modified to some extent in cars whose rear tires are larger than the front ones.

Formerly excessive front tire wear was caused by the placing of too much weight over the front tires. This was regarded as necessary to prevent the long wheelbases now generally employed. Modern cars generally are built entirely behind the front axle, and with liberal wheelbases, so that undue wear on the front tires may be ascribed to either misalignment of the wheels with the axles or to misalignments of the steering connections.

The latter is more difficult to detect than bad wheel alignment, and harder to remedy. Fig. 4. shows the Ackerman principle of steering, such as employed on all motor cars. It will be noticed that the steering arms are aligned so that their center lines intersect at the central point of the rear axle. This alignment is independent to some extent, of the wheel alignment, as both wheels may be correctly cambered and gathered, with one of the steering arms at a faulty angle. In moving straight ahead, this would have



The Readers

no effect, but in turning, the wheels do not run on a true circle, so that both wheels are subjected to a tire grinding. The same effect results from the tie-rod being too short or too long.

To determine whether or not the steering connections are properly made it is necessary to know that the angle of the steering arms and the axle spindles is right, and that the tie-rod is of the right length. As both of these depend upon the distance apart of the steering king-bolts and on the wheelbase of the car, it is impossible to give definite instructions.

Given the wheelbase of the car, and the distance between king-bolt centers, the diagram may be laid out as in Fig. 4. Measuring the angles of the steering arms, as made with the axle, the correct angle that the steering arms on the car should make with the car axle is found. Frequently in lining up the wheels of a car, the steering connections are thrown out by lengthening or shortening the tie-rod to get the proper gather. This should never be done, as improper gather is usually the result of bent wheel spindles. To leave the bend in them, and to turn the steering arms around merely robs Peter to pay Paul. The tire wear resultant from bad wheel setting is obviated at the expense of a serious wear on account of faulty steering. This is made clear in Fig. 3.

2—Yes.

SUGGESTS AN INTAKE MANIFOLD Hot-Water Heater for Inlet Header in Cold Weather

Mt. Carmel, Ill.—Editor Motor Age—In Fig. 1 is illustrated a good way to water-jacket an intake manifold with $\frac{1}{4}$ -in. copper tubing for the present low grade of gasoline. The water line is tapped on each side the motor and a coil of copper tubing wound around the manifold.—Stuart Keneipp.

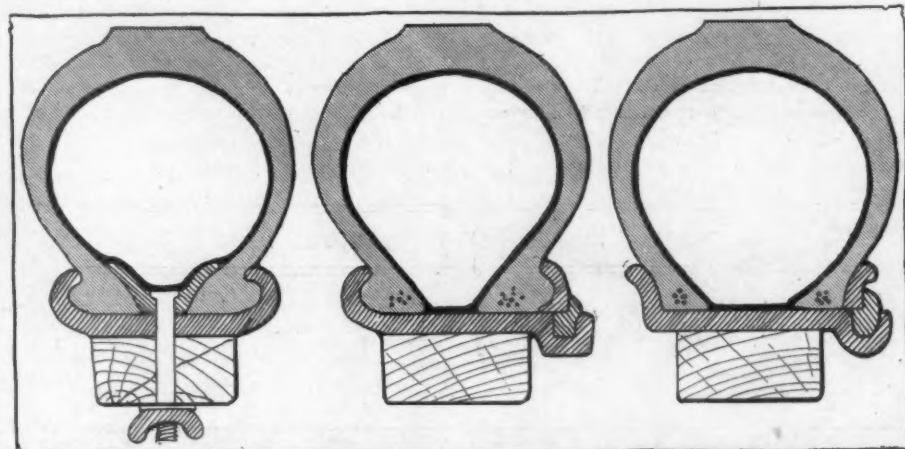


FIG. 2—TYPES OF CLINCHER AND QUICK DETACHABLE RIMS

OPERATION OF GRADE INDICATOR

Gradometer May Be Separately Installed—Hardening Die

Monessen, Pa.—Editor Motor Age—Kindly explain in detail how a gradometer operates.

2—Could a gradometer be installed independently of a speedometer?

3—I would like a list of the concerns making gradometers.

4—How can I temper a screw plate tap?—J. J. C.

1—Motor Age knows of but one gradometer on the open market at present, and that is the Stewart, which is part of the speedometer instrument. The apparatus is shown in Fig. 5. In the lower illustration W is a weight which is integral with an arm. The arm has at the end of it a sector B. In mesh with the B is the pinion C. As will be noticed C is at the end of a shaft to which is attached a drum. The drum has upon it a calibrated scale. Now if you will take this page and turn the right side downward, the weight may be imagined coming forward. This action pushes the sector B upward. The pinion turns then toward you. The drum revolves and registers the grade in per cent. In moving the page to the right the instrument is made to tilt as it would if the car were going up a grade. In the upper illustration the lock arm A is shown in position. This is operated by a button on the outside of the instrument. When the gradometer is to be used the arm is moved upward and unlocks the gradometer mechanism.

2—Yes.

3—Motor Age knows of none making a specialty of such instruments.

4—The die is heated to a red heat and immersed in water or brine and held still for a while and then slowly moved around. After this it is held over a fire to take out some of the chill. In using water for quenching, about 3 inches of oil on top of the water will toughen the steel.

Clearing House

CHANGES PUMP SYSTEM TO THERMO

Alteration of Cooling System Requires Larger Water Pipes

Orange, N. J.—Editor Motor Age—What relation do the pipe sizes of a thermosyphon cooling system bear to each other, namely, the size of the top pipe cylinders to the top of the radiator and size of bottom cylinder to the bottom of the radiator?

2—Does such a system need an auxiliary tank on the back of the radiator of a 35 horsepower car?

3—Will the radiator need to be kept perfectly full to make the system work? If so, how is it piped to allow for leakage and evaporation?

4—Is there any structural difference that would prevent a magneto spark plug from being used on starting on the batteries as in a Splitdorf low-tension system with non-vibrating coil?

5—Can a clincher tire be used on a quick-detachable rim and would doing so cause the tubes to puncture where the tube touches the rim and right in the center, the puncture looking like a sharp cut parallel to the plane of the wheel?—E. W. Bachman.

It is good practice to have the inlet and outlet pipes of a thermosyphon cooling system of the same diameter. The object of the design of the water pipes should be to offer as little resistance to the flow of water as possible. When the speed and requisite volume of the water is determined, the pipe size should be such that practically no resistance other than surface friction and the resistance of angles in the passages is offered. Both pipes should be the same size for neither should be smaller than this minimum size, and no advantage is to be gained by making the pipes larger than necessary. Your use of the term cylinder is a trifle obscure, but in the above manner it has been assumed as referring to the size of the inlet and outlet pipes.

2—This depends entirely upon the capacity of the radiator. If your radiator is too small a tank will be required, although it is far more satisfactory to have as much of your water as possible contained within the radiator.

3—The radiator need not be kept full. The difference in volume of hot and cold water is not sufficient to be considered.

4—The so-called magneto spark plug

differs from the battery type in that the sparking points are usually made of platinum, to resist the relatively hotter spark of the magneto at high speeds. The battery spark being less severe can be applied to a magneto plug with no deleterious results, for the heat to which the sparking points are subjected from the battery spark is not as severe as that for which they are designed.

5—There are two types of clincher tires and two types of quick-detachable tires. The plain clincher tire is all rubber and fabric and is designed to be used with a hooked rim, and to be secured by lugs bolted to the wheel felloe. The quick-detachable clincher tire is designed to be used on a hooked rim, with a removable bead. This type of tire has wires in its base, and is secured by the pressure in the tire.

The two types of quick-detachable tires are the clincher type last described, and the straight-side type, in which the beads are not hooked. The plain or old-style clincher tire cannot successfully or safely be used on a quick-detachable rim, because there are no lugs to secure it. The quick-detachable clincher tire may be used on a plain clincher rim, but it will be found very difficult to stretch the tire over the stationary bead.

Such a puncture as you describe could hardly be caused by using the wrong tire on the wrong rim, being more likely the result of a pinch. Fig. 2 shows the types of tires and rims described above.

Questions Answered and Communications

I. T. Gilroy.....El Paso, Tex.
Stuart Kenelpe.....Mt. Carmel, Ill.
J. I. C.....Monessen, Pa.
E. W. Bachman.....Orange, N. J.
H. A. Rowe.....Harvard, Ill.
A. C. Strong.....Burlington, Ia.
Subscriber.....Neche, N. D.
W. T. M.....Lemota, Tex.
D. B.....Memphis, Mo.
Charles Golding.....Frederika, Ia.
C. C. Hahn.....Wellman, Ia.
B. W. Hinton.....Reynolds, Ga.
A Subscriber.....Belle Plaine, Minn.
A Subscriber.....Centralla, Mo.

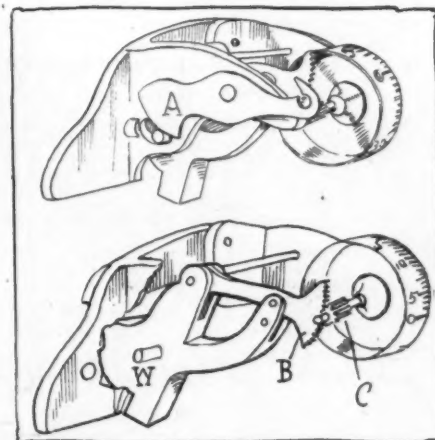


FIG. 5—DETAILS OF STEWART GRADO-METER

PRUSSIC ACID VERY DANGEROUS Unsafe to Be Handled—Not Recommended —Injurious to Motor

Harvard, Ill.—Editor Motor Age—1—Will Motor Age please explain the effect of prussic acid when added to gasoline and used in a motor.

2—Is it dangerous?
3—Is it injurious to the motor in any way?
4—In what proportions may it be used?
5—What does it cost in any given quantity?
—H. A. Rowe.

1 to 5—In the first place prussic acid is a deadly poison and under ordinary conditions it is difficult even to handle it. If mixed with gasoline the resulting fuel will from all appearances give less efficiency than gasoline alone. It is not dangerous as a combustible fuel, but it is a poison and an inhalation of the fumes of the acid to any extent will cause death.

The result of prussic acid acting upon the metal of the cylinders and pistons will cause a deposit of iron carbide or perhaps iron cyanide to appear on these parts. The action however is not rapid. Motor Age is of the opinion that you mean picric acid. Prussic acid is not recommended for use as a substance to be mixed with gasoline.

A DOUBLE-TERMINAL SPARK PLUG This Type Suitable for Changing Single Ignition to Dual

Burlington, Ia.—Editor Motor Age—Will you please give me addresses of firms handling a double terminal spark plug; viz: one requiring two wires, and no ground.—A. C. Strong.

The Jeffrey-Dewitt Co., Detroit, Michigan, is the only firm Motor Age knows of in America that manufactures double terminal plugs. The plug is called the Jeffrey-Dewitt dual plug, and is designed to give two sparks in the same cylinder at the same time. It may be used also for transforming a single ignition system to a dual.

In England, the Lodge double-spark plug is made by Lodge Bros., Birmingham, England. The plug is so arranged that it may be connected in series with others, and all in series fire at the same time.

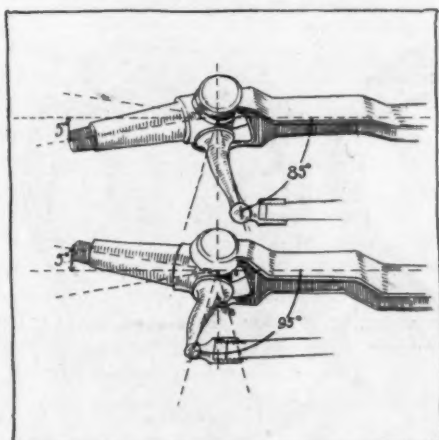


FIG. 3—ILLUSTRATING WRONG STEERING ADJUSTMENT

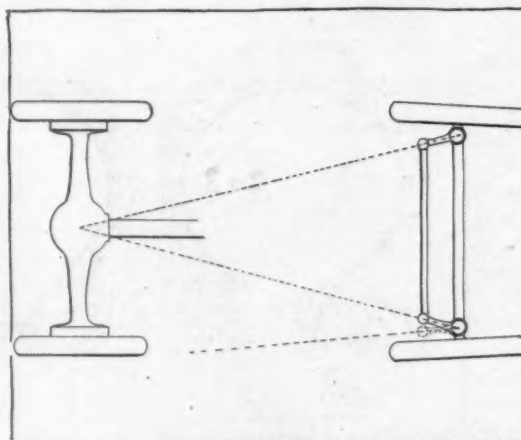


FIG. 4—THE ACKERMAN STEERING PRINCIPLE DIAGRAMMED

DYNAMO FOR CHARGING BATTERY

Arrangement of 15-Watt Lamps.—Circuit Breaker Needed

Wellman, Ia.—Editor Motor Age—I have a 32-volt, 28-ampere compound-wound dynamo. I would like to know what kind of material is needed, also want instructions for building a resistance coil to charge an 8-cell, 16-volt battery from this dynamo, at the rate of 7½ amperes. Also explain how one arrives at the result.

2—I also would like to know how to build a simple under-load circuit breaker for a safety device to be used between the dynamo and battery should the dynamo stop.—C. C. Hahn.

1—In Fig. 7 is shown the arrangement of the apparatus for charging a battery that requires a 7½ ampere charging rate. The lamp bank is composed of sixteen 15-watt gem lamps, which may be procured from the General Electric Co. These lamps consume about .5 ampere each. Then sixteen would consume about 8 amperes. One lead from the dynamo is led to an ammeter. The other terminal of the ammeter is connected with the bank and, as will be seen from Fig. 7, the line extends to the battery. A voltmeter is connected across the battery terminals. The initial charging rate should be about 5 amperes. To get 5 amperes, take out about six of the lamps. If six will not bring the ammeter reading down to 5 amperes, take out another. After the 5 amperes has been flowing for about 2 hours insert two more lamps, and keep increasing the lamps until the ammeter reads 7.5. The reason this is done is gradually to increase the charging rate. Motor Age cannot determine how long charging should continue, because the capacity of the battery is not known. The battery manufacturer should be consulted as regards the length of time a charging rate of 7½ amperes should be continued.

2—Motor Age would not advise building a circuit breaker, for the reason that much care and calculation is necessary. It will be found much cheaper to buy one for the purpose needed. Any big electrical house is ready to serve you.

LOOSENESS IN SPARK CONNECTIONS

Lost Motion in Timing Control May Be Cause of Troubles

Reynolds, Ga.—Editor Motor Age—I find it impossible to keep the cylinders of my 1911 Case car free from carbon. This has been giving me trouble for nearly a year and seems to get worse. I have tried several of the best cylinder oils, have put on a new carburetor and have put in new piston rings. The engine is in good condition. Since putting in the new piston rings it has better compression and uses no more oil than when it was new. I can have the carbon scraped out and the engine will begin knocking in less than a week, so that on a pull I have to retard the spark so much that I cannot get near the power I should.

The magneto, a Remy type S, on my car has always been unsatisfactory and seems to give a weak spark, especially when running slow with the spark retarded. I frequently have to switch to the batteries on a slow pull. Does Motor Age think that this magneto could, by making a weak spark, be the cause of my carbon trouble? I do not see how it could be in the quality or quantity of the oil I use, or that my carburetor gives too rich a mixture. Would it be advisable to have my magneto recharged or buy a new one?—B. W. Hinton.

1—Your trouble in all probability is with the weak magneto, although the continual use of poor gasoline may be the cause of carbonization. The knocking on the grades may be caused by a disarrange-

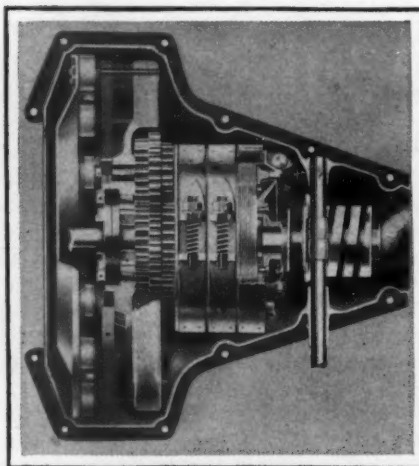


FIG. 6—FORD PLANETARY GEARSET

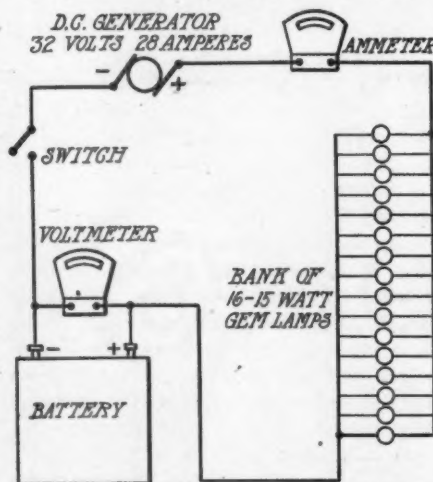


FIG. 7—RESISTANCE FOR BATTERY CHARGING

ment of the spark control mechanism. Look over the line from the lever on the steering column to the attachment at the magneto and see that no play exists at any of the joints. Perhaps you move the lever on the steering wheel and imagine you are retarding the spark when in reality the play in the joints has been taken up and the spark remained as before. It would be deemed advisable to have the magnets recharged, for weak magnets will cause an inefficient spark to occur. The best thing to do would be to send the magneto to the factory and ask the latter to put the magneto in condition for operation.

PURPOSE OF PACKARD GOVERNOR

Engine Regulator in Cooling System Prevents Racing

Belle Plaine, Minn.—Editor Motor Age—1—How many gears has the Ford car in its planetary transmission for 1913?

2—Have they increased or decreased the number of models for 1910 or 1911?

3—Kindly illustrate the Ford transmission for 1913.

4—Is there any motor made either in America or abroad using piston valves?

5—If so, are they a success?

6—Why is not the use of a sleeve valve motor in a racing car continued?

7—For what purpose is the water governor on the Packard?

8—Does it cause the water to circulate faster when it gets to the boiling point?—A Subscriber.

1—There are three sets of triple gears, making nine in all.

2—Ford makes one chassis model only, as formerly.

3—The Ford gearset is illustrated in Fig. 6.

4 and 5—The Laycock, Royce, Reeves, Staar, Bostock and Doue motors are piston-valve design, which have very good features. They have not been in service long enough to determine value of piston-valves.

7—The water governor on a Packard is used to prevent the motor from racing when the load is removed by throwing out the clutch. It also tends to keep the motor running at a constant speed regardless of road conditions. The action is explained as follows: When the car ascends a grade the motor tends to slow down, due to the increase in load. A decrease in motor speed makes a corresponding decrease in the pressure at which the water is passing through the water pump. The governor being directly above the pump is affected by the decrease in pressure and springs back, at the same time opening the throttle. In other words, when ascending a grade the motor speeds up just enough to keep the car going at the same speed it did when on level ground. The reverse takes place when the car is descending a hill.

8—The governor has no control over the circulation under any conditions.

6—Only two performances have been made by sleeve-valve motors in contests, and because they have not been entered recently is no sign that this type of motor will be abandoned in racing motors. The Sigma-Knight finished in tenth place in the Targa-Floria race in Sicily, last summer. A Mercedes-Knight tied for first place in the Belgian team race held also last summer.

OVERHAULING A 1910 POPE-TOLEDO

Hot Engine Misfires and Runs After Switch Has Been Closed

Centralia, Mo.—Editor Motor Age—I have a Pope-Toledo car, 1909 or 1910 model, which I wish to overhaul and make some changes if advisable. The motor seems to have too much compression, and is hard on the plugs; also knocks when not properly throttled. When the engine is hot there seems to be pre-ignition. It will run after the ignition is switched off, and will back-kick, when cranked.

2—Would it be advisable to lower the compression, and how?

3—What compression has the Pope engine and what is proper for gasoline engines?—A Subscriber.

1—A motor cannot increase its compression except by carbonization. The Pope-Toledo motor was designed with normal compression, and at the age of the present survivors of this make, the tendency would be towards loss of compression. Your difficulty undoubtedly is due to one of three causes. The first, and most common in old cars whose behavior is such as you describe, is carbonization. If the engine is carbonized badly, the points of carbon become very hot, which results in pre-ignition. They will also supply ignition, after the current has been switched off.

Another prolific cause is a rich mixture, which will run on heat after the current has been switched off, and will ignite before dead center in cranking the engine hot, causing a back-kick. The third cause, not so usual, but occasionally met with, is bad spark-timing. If the spark is too early, the mixture will be ignited before dead center, causing a back-kick. If you get a back-kick in a cold motor, it is because your spark is too far advanced.

This may be the fault of the magneto setting, or the linkage to the distributor. If the latter is out of adjustment, the extreme retard may be too early, so that the spark occurs before dead center, instead of after, or the linkage may be loose, so that the commutator does not respond to the spark lever. The fact, however, that your motor runs on heat indicates carbonization or a rich mixture, one or both, while the back-kick in starting, if it occurs in the cold motor, indicates an early spark.

2—No.

3—About 65 pounds to the square inch is considered normal compression for motor car engines.

CAR AND AERO ENGINES VARY Aerial Motors Lighter and Run at Higher Speeds

Neche, N. D.—Editor Motor Age—Are the engines in aeroplanes of the same type as those employed in motor cars?

2—Why do aeroplane manufacturers make motors V-shaped and use a multiple of cylinders?

3—I would like some suggestions for a repair shop for motor cars and other machinery which I intend erecting. It is to be a 64 by 30-foot structure, with 10-foot sides, cement floor, metal siding both inside and out, as brick and cement are so expensive. I am particularly anxious to secure the best light possible, and what arrangements and suggestions has Motor Age to offer?—Subscriber.

1—Yes, except that they are designed to be lighter and to run at a higher speed than motor car engines.

2—The V-shape usually is to get better cooling than can be obtained with all cylinders in a line, as these motors are air-cooled. The multiplication of cylinders is to give more even torque and to make sure of power enough for safety if one cylinder misses.

3—Use as much window space as possible. The saw-tooth skylight roof is very efficient. The design illustrated in Fig. 8 could be altered nicely to suit your conditions.

CUT-OUT INCREASES POWER

Engine Usually Develops More Power Without Muffler

Lemota, Tex.—Editor Motor Age—Many motorists claim that opening the muffler cutout gives an engine more power. Is it a scientific fact?

2—Is the William Carburetor Co. of Buffalo, N. Y., still making carburetors? Has this make an air adjustment? Give me any information you have about this carburetor.

3—I have a fixed spark on my four-cylinder motor which has a bore and stroke of 3 3/8 by 3 3/8 inches. I have set the spark to fire at half-inch before top dead center. Is this too far advanced? If so, what is the correct place

for a fixed spark? The motor is fitted with a Bosch high-tension magneto.

4—In boring out old cylinders to insert a larger piston what is the next size about 3 3/8? Can this be done where cylinders are cast in pairs with the partition wall rather thin?—W. T. M.

1—Ordinarily, opening the cutout increases the power of the motor somewhat because it releases the back pressure due to the obstruction interposed in the muffler.

2—So far as Motor Age knows the carburetor is manufactured no longer.

3—If your motor does not backkick on cranking, the spark is not too far advanced, except perhaps for excessively heavy pulls. You can get more speed out of your motor with this advance.

4—It would not be safe to increase the bore to more than 3 3/8 inches and you probably can get pistons of this size from the factory.

GARAGE DESIGN FOR SMALL TOWN

To Be 1-Story Building and Have 40 by 50-Foot Repair Shop

Memphis, Mo.—Editor Motor Age—I would like some suggestions as to the arrangement and equipment of a garage and repair shop suitable for a town of 3,000 population with good transient and country trade. The size of the building to be 50 by 120 feet, one-story brick or cement block, with the repair shop 40 by 50 feet at the rear.—D. B.

Fig. 8 shows a garage which would suit the requirements stated beside being convenient and cheaply maintained. It allows of cars entering at one side and leaving at the other, thus avoiding any congestion in getting in and out. Gasoline and oil are handy to the street, besides being under the direct scrutiny of the office.

Posts should be barred and the roof supported by trusses, making the working space much more valuable and saving

many accidents to lamps, fenders and varnish. Heat is supplied by a hot-water apparatus located in the repair shop. It is of the overhead supply type—that is, the supply veins extend from the boiler at the ceiling height and branches drop down to the coils and radiators and return just above or under the floor. Steam could be used, but the boiler would have to be sunk considerably in a pit before this could be used at all successfully.

A small gasoline-electric generator set with suitable switchboard is suggested for charging electrics and running the lathe and drill-press in case the local service is not direct current. Sky or other kinds of roof lights are a necessity if the garage is on an inside lot and are desirable in any case to make things cheerful and airy and attractive to transients who use it.

HARD STARTING REMEDIED

Aids in Picking Up, but Not in Initial Starting

Frederika, Ia.—Editor Motor Age—I notice in cold weather that it is more difficult to get my Schebler carburetor set so that it will not miss and clean up all the gasoline. I understand on some makes of cars they have what they term the high water-jacket on the Schebler model L which, it is claimed, helps to vaporize the gasoline in winter. Does this jacket arrangement give good satisfaction in winter?

I would think that a high water-jacket, or good hot water or any anti-freeze would help to remedy this, as it would seem that in very cold weather it would be almost impossible to get a carburetor too warm. I understand that they heat them, but as a rule do they have the hot water pipes to the carburetor large enough for good service in very cold weather?—Charles Gilding.

The hard starting in winter is due to the fact that the gasoline does not vaporize readily. Any method which will warm up the fuel will help conditions. The hot-water jacket, it has been found by many, gives satisfaction, but often the hot-water pipe is too small for efficient service when a carburetor is so equipped.

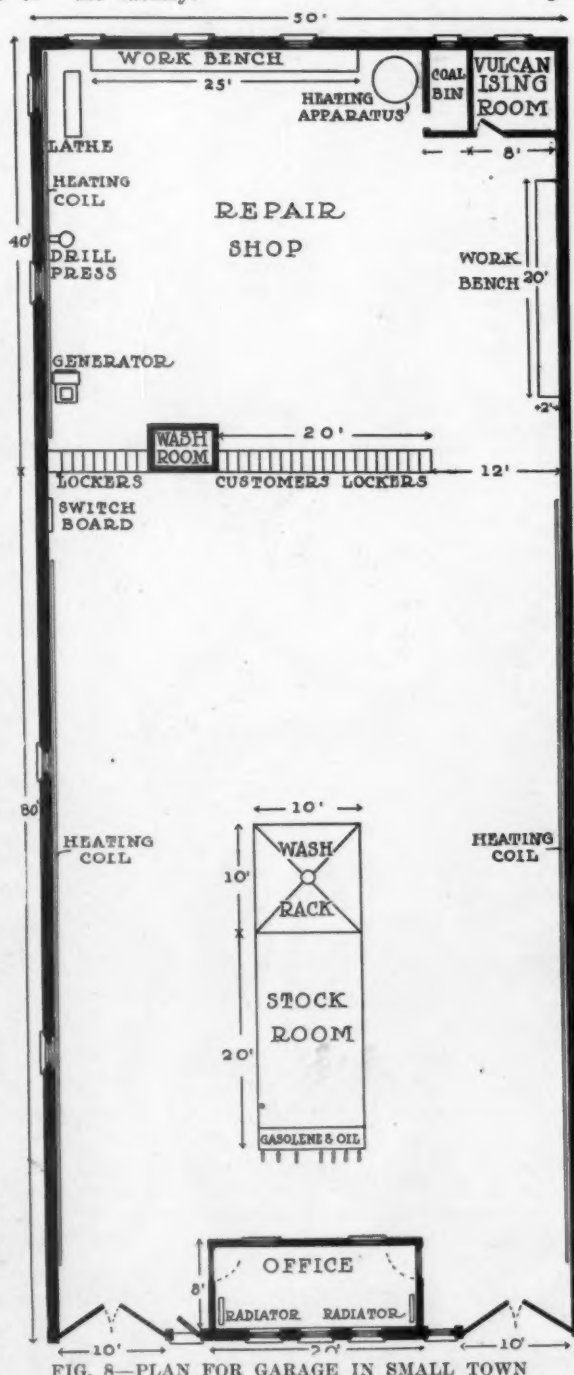
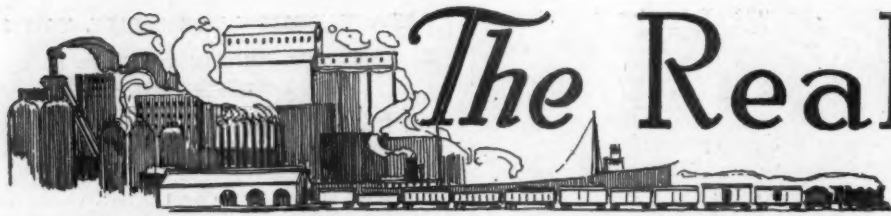


FIG. 8—PLAN FOR GARAGE IN SMALL TOWN



The Realm of the

The Motor Truck and Scientific Management

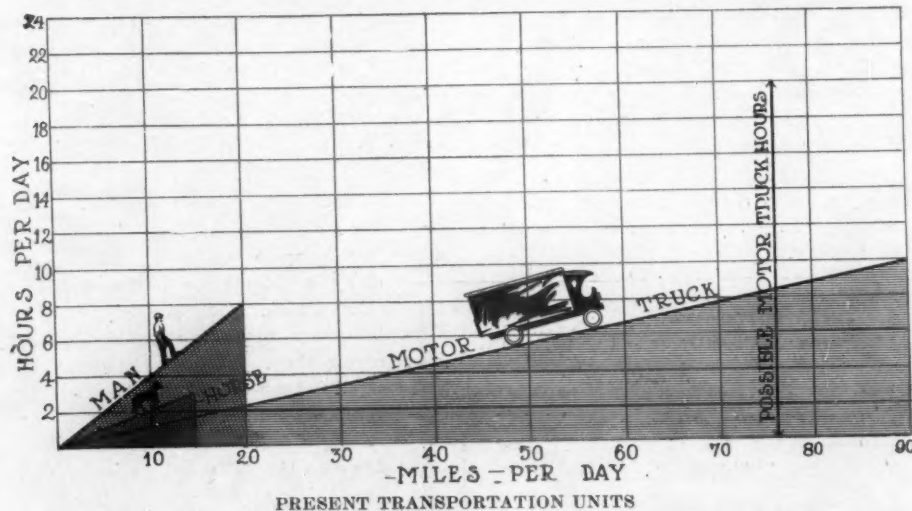
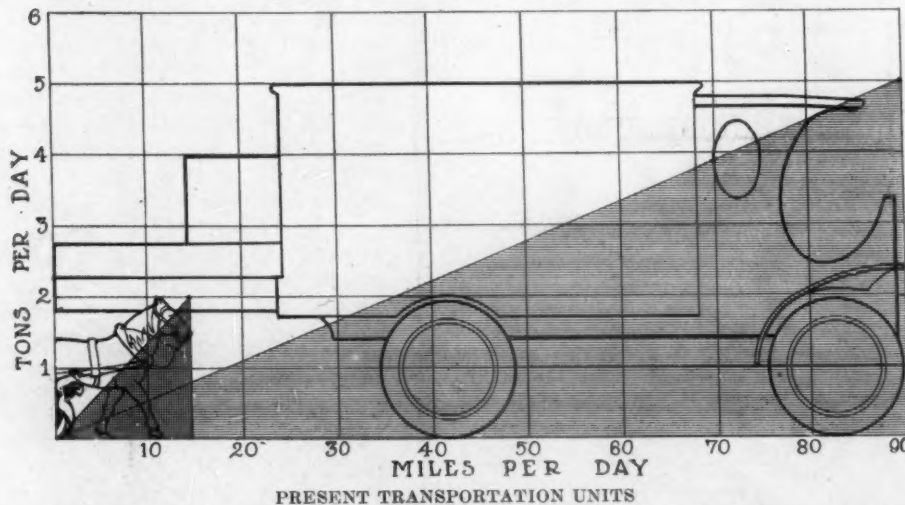


Diagram showing the comparative daily mileage and hours of work of man, horse and motor truck, the maximum figures being given for the man and horse and the maximum in a 9-hour day with the truck. Many trucks are working 20 hours a day



Showing comparative daily tonnage miles, man, horse and motor truck, figured on maximum average for man and horse and 9-hour day for truck, at 10 miles per hour

It is fortunate that the age which brings into being scientific management for application to all industrial conditions brings with it devices and appliances which can be applied to so great a saving in the application of these principles.

Demonstrated by Road Haulage

In no line is this more forcibly impressed than in road hauling, where the very basis of real scientific management it is at once discovered must be some other source of moving power than the wasteful horse. The motor truck is here to fulfill the conditions which scientific management, as applied to the delivery of goods, will demand. In the motor truck lies the future of really efficient road

By William B. Stout

transportation, but before the motor truck takes this first place the slovenly horse methods of the hauling business must give place to modern industrial management based on scientific facts.

At present the whole system of road transportation of goods is in a chaotic stage of development. Everything is a jumble of useful and useless figures, and what real figures are available few know how to apply. Very few modern firms know what their horse delivery is costing or have many any approximate figures. They handle their delivery as their neighbors do and are satisfied at that.

A man writes in to a motor truck firm or trade journal and wants to know what it will cost to run a gasoline car per day; another wants to know the relative cost of operation of a gasoline or electric car. The very fact that he asks such a question is proof that he is not versed in transportation methods. One might as well write to a concern and ask how long a pound of butter would last. It all depends on the use.

Seekers After Information

Another man writes in for averages. These can be given and one might say that the average city running cost of a $3\frac{1}{2}$ to 5-ton truck with driver and all entailed expense was \$12 per day. This fact would not justify any man, however, in thinking that this would be the cost of operating his vehicle; it might be more and might be less, depending on mileage, idle time, road conditions, labor conditions, hills, etc. The average motor truck, another says, does the work of two to three horse vehicles of the same load capacity and costs twice as much to operate. Again this cannot be taken as gospel, for some trucks in some services would make no better showing than horse rigs, and at twice the expense or more. Others have displaced fifteen to twenty teams.

How, then, you say, is one to know what to do, what his delivery service will cost him, and what plan will bring best results at lowest cost? It is at this point in the search for knowledge that a scientific method is necessary for determining these points, for no one case will tell what the demands of another case will be, although the principles involved in looking up one case will do for others. It is the application of scientific principles to the problems of business management in industrial lines more especially that has been termed scientific management.

Scientific Management Defined

Scientific management then is the application of past experience and present reasoning, together with all available scientific knowledge in engineering, physics, psychology and allied sciences toward the accomplishment of certain ends with the least possible amount of labor, etc. Defined as such there is nothing seemingly new to the idea, it being only a more serious getting-down-to-business move on the part of various industries, rather than working by rules-of-thumb dictated by custom. Because our fathers for 1,000 years did a certain thing in one way, is no indication that it is the best way.

Commercial Car



There is more than mere systematizing to the new movement. Instead of aiming to get a maximum of work and profit from an individual as the first item, scientific management aims to accomplish given processes and operations with a minimum expenditure of work. In doing this instead of making the workman work harder it eventually lightens his labor and shortens his hours. Every operation has its units and every system of hauling its unit bases. To goods in carriage cities there are three units; the man, the horse and the motor vehicle. Each is a unit with a certain value. An average man can do just so much a day. If he does more he is inefficient the next day. The same is true of any animal. For example: an ordinary man carrying a burden and returning unloaded can perform the equivalent of 5,000,000 distance foot-pounds a day; that is, carry 5,000 pounds 100 feet. This is the published unit of man's work.

Some Examples Cited

A horse can carry seven times this amount in a day, nearly 35,000 pounds.

A man can walk 20 miles a day, a horse but 15.

These are the limits of efficiency of these two units of the system.

The third unit is a motor truck. This machine can make 10 miles per hour with a 5-ton load for 9 to 20 hours in the day. Contrast its possibilities with the other two units.

The horse can do 15 miles with, say, a 2-ton load, 30 ton-miles per day; the truck can do 200 miles maximum with a 5-ton load, or 1,000 ton-miles per day. That no

trucks are doing this does not prove untrue the statement that the truck is capable of this. It could be demonstrated by any good 5-ton truck on the market and very easily. Without traffic delays, stops to unload, etc., it could do this every day.

Man's Limitations

Forgetting the motor truck for a time, go back to the man as a unit. The man is a machine having certain limitations as stated before. He can do so many foot-pounds of work a day and no more. If he does less there is waste.

This man is driving a horse team capable of making 5 miles an hour. It can do but 15 miles a day, so that 3 hours is the limit of its road work. The remaining 5 hours are left for loading and unloading. With plenty of time at hand the driver takes his time, uses, say, 2 hours of the day in actual carrying of goods to and from the wagon and loafs the rest. Analyze the wastes.

In the first place the wagon or whatever vehicle is hitched to the horse or horses is not working to capacity. It also is idle for a large percentage of time and where it was built and intended for the containing of merchandise and material during loading, unloading and road hauling continuously it is empty a large percentage of the time and as an investment is producing but 5 hours in the 24. The man as well is not working to capacity,

there being waste to the amount of 3 hours out of a possible 8. He is using but 63 per cent of his ability and 37 per cent of his hire is lost.

Thus the inability of the horse to do more than a certain unit of work a day is allowing the wagon and equipment to work to only 14 per cent of its possibility and the man or men to but 37 per cent. At the same time the mental side of the man has no stimulation or exercise to develop it into anything better even during the time the vehicle is on the road, this time is spent at work far below the capacity of the man. The average teamster in a full day's work is not accomplishing 30 per cent of the work of which he is capable without in the least overworking and with little more effort he is putting forth at present. This loss is due to the delivery unit and its limitations, and not to the man. It has made of teamsters a slow-thinking, easily led, dissatisfied lot through this very knowledge within themselves that they are not working to capacity, but if given a chance could do better.

Production Demanded

Any factory manager who had a machine capable of turning out a hundred pieces a day who stopped work when thirty pieces were done and left the machine idle the rest of the day soon would seek a new job, or the factory would shut down permanently. To date the world has been con-



IN hilly country the motor truck reigns supreme. Where heavy grades are to be surmounted with heavy loads a motor truck can make a great deal better showing than in level country, while with the horse the opposite condition obtains.

A unique use of the motor truck is shown in the illustration of a Packard hauling fifteen wagons loaded with 40 tons of boulders for the construction of a tourist hotel at Asheville, N. C., the truck hauling the loads down a mountain road to the site of the new building. These boulders, of which the hotel is to be constructed, are obtained from the other side of Sunset mountain, hauled by horse to the motor road on sleds, and here loaded to the truck trailer wagons. The loaded wagons are hauled downhill, as shown, and on arrival at the building site are left and a string of empties hauled back up the road.

The wagons are fitted with an ingenious device for steering them in a line, which works perfectly. The connecting pole or sweep between the axles is made to project 4 feet to the rear of each wagon. The pole of the wagon at the rear is cut off to a 4-foot length and coupled to the sweep end with a link. In swinging a curve the rear end of the sweep steers the following wagon, so that all run in the same track.

This is but one of numerous unusual uses to which the motor truck is being put as men are finding out its capacities.

THE fabulous house that Jack built had nothing on the new hamburger palace on wheels that Otto has just built. Otto, the balance of whose name is Sauerberg, is the hamburger dispenser extraordinary of Grand Rapids, Mich. Some 7 years ago, a student fresh from the University of Wisconsin, he located Grand Rapids as the first way station on his road to wealth. Otto's chosen medium for luring the ducats was the festive hamburger, his contributors the night wayfarers of a prosperous community like Grand Rapids.

Establishing himself in a portable shack on wheels, he began his career by concocting sandwiches which were a good bit better than those devised by any rival in the business. Within a year Otto's night lunch wagon was one of the institutions of Grand Rapids. Traveling salesmen and traveling actors spread his fame, and inquiries concerning the location of his wagon soon outnumbered those about the city hall.

Now, while Otto may not be said to have yet arrived at the goal of great wealth, he is drawing near his plutocratic destination. So, to rid himself of the incubus of overcapitalization, he has just spent a small fortune in building and equipping a night lunch wagon well calculated to make all beholders sit up and blink.

This is a motor lunch bus, the most pretentious and most sumptuous affair of the kind ever attempted. Christened "Ye Wayside Grille," it replaced the shabby relic of bygone days on the familiar downtown corner opposite ye Morton house.

This motor restaurant is entirely the design of its owner, who is somewhat of a mechanical genius. Its general aspect is something like that of a palace dining car, finished outside in white, inside in solid oak. The weight of the car is 5 tons, its wheel base 180 inches. The mechanical construction is simple, but sufficient—a Monarch air-cooled, two-cylinder opposed motor, Muncie jackshaft and transmission, Gillette roller-bearing axles, 24-inch sprocket, rear wheels geared 12 to 1, and equipped with Firestone solid tires. The steering apparatus is located just forward of the entrance to the diner, the doors swinging inward so as to inclose the wheel, which is set horizontally, like that of a motor boat, when the grille is at its stand of business. The superstructure is 22 feet over all, 8 feet wide, and has seating accommodations for twelve patrons. The grille is located in the remote end of the car. It is equipped with electricity for lighting and gas for cooking.

tent to run the delivery machine to a thirty-a-day production; with the increasing use of the motor truck this content is vanishing and there is a demand for at least a 90 per cent production. This will not be reached as long as horses are used in delivery work.

The man figuring for the installation of trucks must study his own conditions. He must know the runs the machines will make, the firms they will visit and how long they will have to stop for a load or for unloading at each point. He must see what points can be hurried up to help the truck, and influence the firms from which he is buying to give all service possible to the motor vehicle, that it be held as short a time as possible at each platform. The man must know the truck routes, the road conditions, the weather conditions, the unusual things such as hills or railway crossings or bridges that might interfere, and after making this study and finding out what time will be taken for a trip, what the average size of the load will be and during what hours the machine can be operated, one can form pretty close estimate of what his service will cost, and what size of truck he must buy.

In adopting the motor truck the unit of delivery rises in enormous proportion, and while it might be said to be the tonnage of the vehicle multiplied by 20 hours per day for the ton-mile unit of the vehicle—which really is a possible ton-mileage for any good make of vehicle—yet in practice the delivery hours will be only those during which the business houses being served are open.

Thus a 5-ton vehicle has a 1,000 ton-mile capacity per day and some vehicles in New York are almost reaching this figure, but in average work a 9-hour day will be all that the truck can be operated in actual delivery work as shown in the tables. The same machine might be let out for the night by contract, however, for some other line of hauling, and thus used for a larger percentage of its time.

In establishing a motor truck delivery

system there must be clear reasoning, scientific study to eliminate every waste and to obtain definite knowledge of delivery conditions. With the motor truck there is no mechanical need for any loss or failure on the part of machine, investment or man, except those business reasons and horse hindrances still extant, which are shortly to be done away with.

ALCO STARTS LONG TRIP

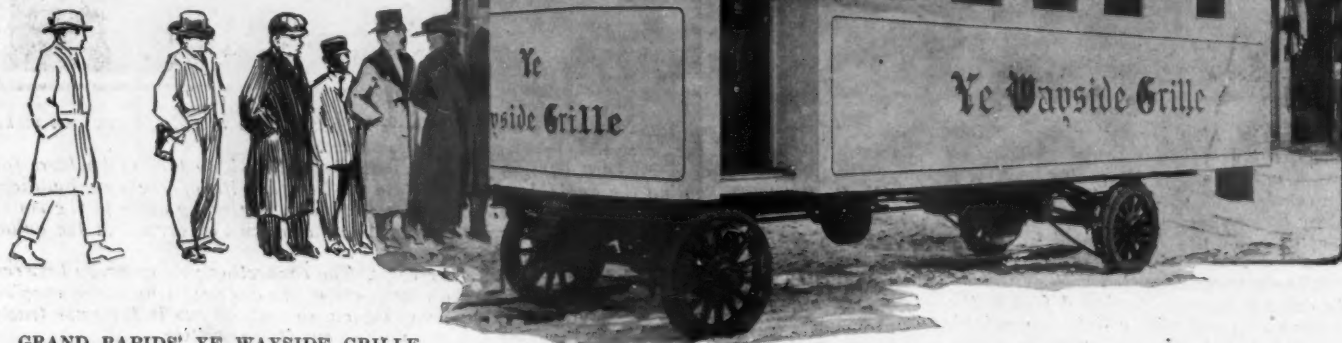
The first delivery of merchandise to be made across the state of Pennsylvania by a motor truck started under way last Monday when a 3½-ton Alco truck set out from the factory of its owners, John Lucas & Co., the big Philadelphia paint concern, with a consignment for the Joseph Horne Co., of Pittsburgh.

Headed by a prairie schooner, the truck attracted thousands in the streets of Philadelphia. It departed at 9 a. m. The schooner that acted as escort was the original means of transportation used by John Lucas & Co. in 1849, when motor trucks were undreamed of. At the city limits the schooner and the truck parted company, the latter to pursue its way westward for 300 miles over rough roads and across the mountainous country of the state.

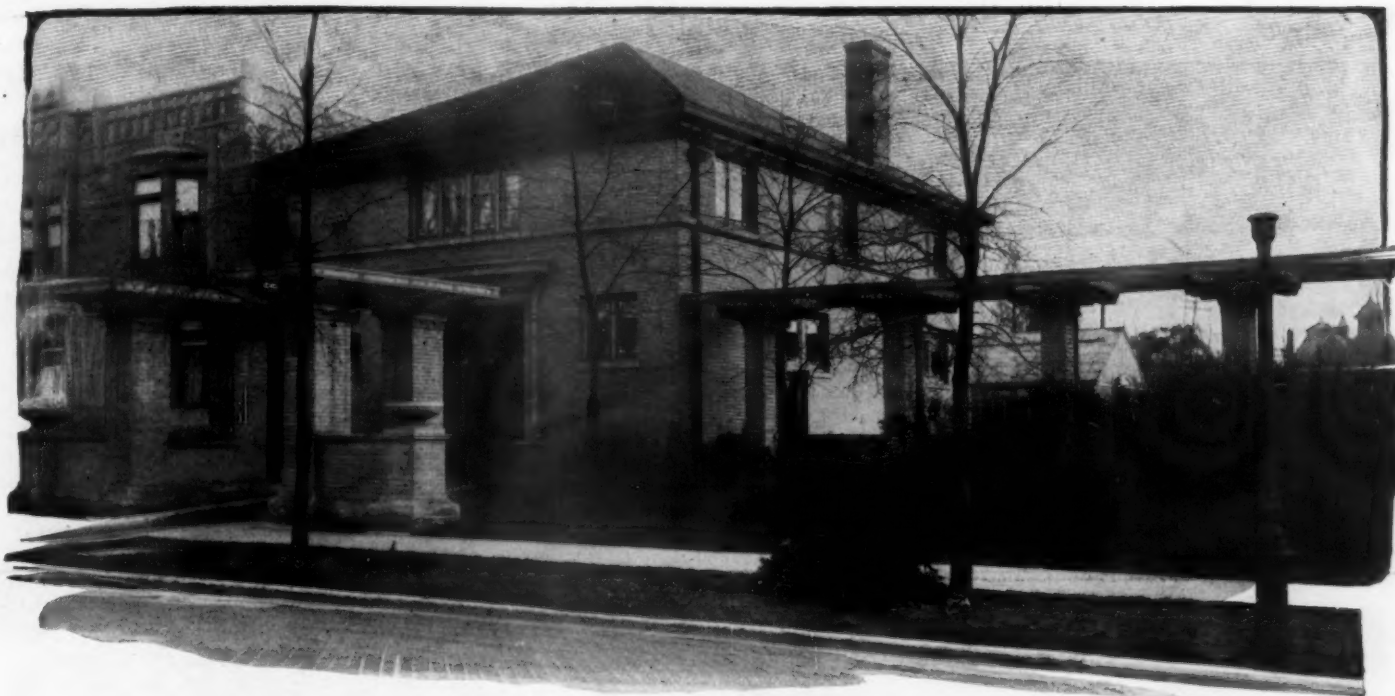
Accurate cost records are being kept of the operating expense of the truck and of horses. It is expected that the results will show motor trucks to be a marked economy in hauling goods between cities, as compared with the operation of horse vehicles. It is thought that this trip will prove the practicability of motorized delivery within a radius of from 50 to 75 miles.

The following schedule for the truck was planned and will be adhered to as far as possible:

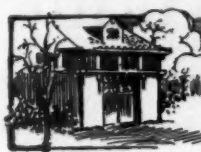
Monday—Philadelphia to Lancaster, by way of Bryn Mawr, Paoli, Downingtown, Coatesville, Christiana and Gap.
Tuesday—Lancaster to Gettysburg, by way of Columbia, York and New Oxford.
Wednesday—Gettysburg to Chambersburg, McConnellsburg, Everett, Bedford.
Thursday—Bedford, Jennerstown, Ligonier to Greensburg.
Friday—Greensburg to Irwin, Pitcairn, Braddock, Wilkesburg to Pittsburgh.



GRAND RAPIDS' YE WAYSIDE GRILLE



GARAGE OF JULIUS ROSENWALD, CHICAGO, WITH FIVE-ROOM APARTMENT ON SECOND FLOOR FOR CHAUFFEUR



Housing the Motor Car *The Garage for the Monied Class*

MOTORISTS who maintain two or three cars and a chauffeur to drive and care for them, usually prefer to provide living accommodations for the chauffeur and his family in connection with the garage. Such arrangements probably are due to the survival of the custom of the old days when the coachman's home was a part of or connected with the building that housed his charges.

One of the best examples of this class of combined garage and quarters for the chauffeur is at the Chicago residence of Julius Rosenwald. This is a two-story brick building about 25 by 42 feet in size. The first floor comprises the garage and repairshop, while the second floor is arranged as a five-room apartment for the chauffeur and his family.

The first floor is divided into four rooms, the most of the space being taken up by the garage proper. This is in the front and is 37 by 25 feet in size. Immediately within the large sliding doors is a combined turntable and washing platform. At the rear, opposite the door, is the repair room. This room is 12 feet 6 inches wide and 15 feet 10 inches long, large enough to permit work on any car. There is no door between garage proper and repair room, the latter being simply an alcove at the rear of the former. In the floor of the repair room is a covered repair pit to permit work under the car, and a sink is located at the rear.

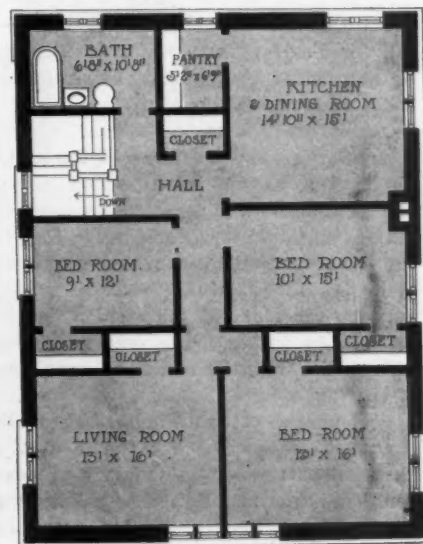
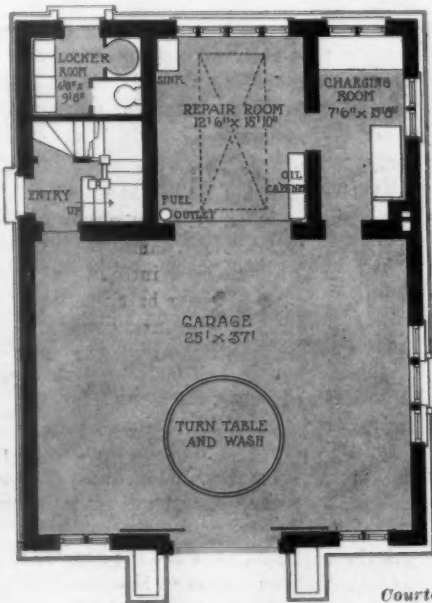
Just within the entrance to the repair room, is the oil cabinet on one side and

the outlet from the underground gasoline storage tank on the other. This arrangement is quite handy, as it permits the car to be supplied with fuel and lubricant on its way to the garage proper, from the daily cleaning up it has received in the repair room.

Opening off both the garage and the repair room is the charging room where the lighting and ignition batteries may be cared for, or leads may be run out to the garage for charging the electric. The charging room is equipped with

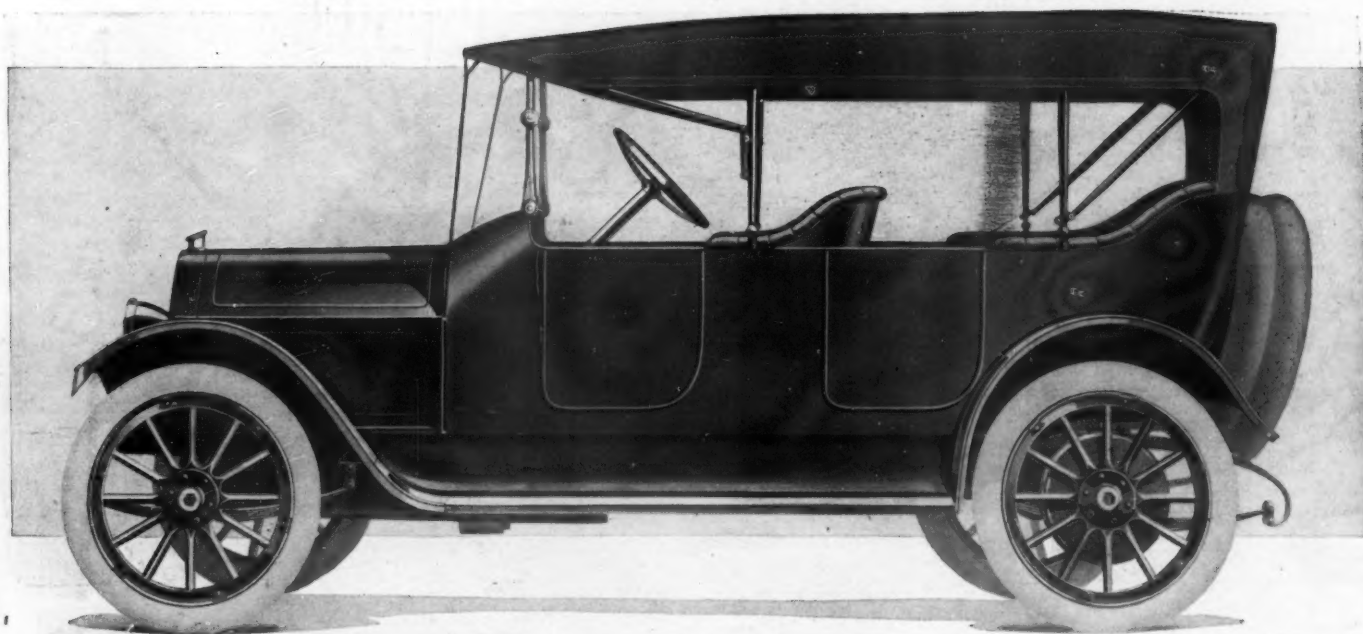
charging panel and mercury arc rectifier. Four or five cars may be accommodated in this garage without excessive crowding of any of them.

Externally, the building shows as much care in its architectural design and finish as the interior does in convenience. It is finished in buff brick, and in front of it next the street is a double-column portal through which the cement driveway passes. An ornamental lattice on brick columns connects the garage building with the residence.



Courtesy of George C. Nimmons, Architect

FLOOR PLANS OF FIRST AND SECOND FLOORS OF ROSENWALD GARAGE



NEW TRIBUNE FIVE-PASSENGER TOURING CAR, PRODUCT OF NEWLY FORMED COMPANY

The Tribune Latest Detroit Product

LATEST among the passenger cars making their initial bid for approval of the American buyer is the new Tribune car, built by the newly organized Tribune Motor Co., of Detroit. The Tribune company is headed by Louis G. Hupp, who has been connected for many years with the motor car industry. As head of the various factories which built the components of the R. C. H., he built up one of the most successful parts-making factories in Detroit, these later being amalgamated into the Hupp Corp., when Mr. Hupp relinquished control.

In pursuance of the plan of building Tribune cars on a large scale, an extensive factory will be built during the summer in Detroit. For the present, the Tribune company will confine itself to the manufacture of a five-passenger touring car to sell for about \$1,250. Later the line will be augmented by roadster, limousine and other body types.

Features of Tribune

Several features of the Tribune are noteworthy as applied to a car of its class. Comfort has been made one of the major considerations, evidently, for the car is exceptionally roomy, the front seat being 41 inches wide, while the space between the front of the cushion and the dash is 30 inches. The rear seat is 47 inches wide with 28 inches of knee room in the tonneau.

Foot pedals which are adjustable to the leg reach of the driver comprise another of the departures from ordinary practice. Another is the installation of a large register with shutter in the toe board for heating the car in cold weather. In connection with the electric lighting system there is another novelty in the elimination

of the side lights. Instead, the headlights are supplied with two sets of bulbs of different candlepowers, a 16-candlepower light being available for country driving, while 7-candlepower bulbs are used for city work. Current is furnished by a lighting generator which also charges the storage battery.

Conventional Mechanical Design

In other respects, the car is of conventional design, being constructed from standard parts. The motor is a Buda special, a four-cylinder, L-head, block design with $3\frac{3}{4}$ inches bore and $5\frac{1}{2}$ inches stroke, giving, it is claimed, 35 horsepower at 1,500 revolutions per minute crankshaft speed. The features of this Buda motor include a three-bearing crankshaft with long, light pistons and long connecting rods. This permits the pistons and connecting rods to be pulled out from below, simply by removing the oil pan and connecting rod caps, so that it is unnecessary to remove the cylinder block or crankshaft.

The motor is oiled by a combination of force feed and constant-level splash. Crankcase and oil pan are aluminum and a bell housing to accommodate the disk clutch is cast one-half integral with the crankcase and the other half integral with the oil pan. A short intake manifold is employed, which is worthy of note in these days of heavy fuels; and the valves are rather larger than ordinary.

Ignition is by a high-tension magneto and storage battery in a dual system; cooling, by pump, extra large radiator and 16-inch fan.

A three-speed Brown & Lipe gearset running on Timken bearings is controlled by a central lever. The steering wheel is at

the left and is of Gemmer worm-and-gear construction.

Timken front and rear axles are used, the rear being floating. The rear axle housing is pressed steel, and an efficient grease retainer is used in the shape of a tube extending from the brakes to a point close to the differential. The construction of the axle is such that the axle shafts can be removed by taking off the hubs. Bevel gear pinion and differential are accessible through a removable cap on the housing. The gear ratios of the Tribune are 13 to 1 on first, 5.75 to 1 on second and 3.85 to 1 on high speed.

Rear springs are elliptic with a single scroll in the rear. They are underslung on the axle on a swivel seat. The wheels are wood as stock equipment, but wire wheels will be supplied at an extra charge. Tires are 32 by $3\frac{1}{2}$ inches. The wheelbase is 116 inches.

Emergency gasoline supply is carried under the dash cowl. This is 8 gallons in capacity and a 10-gallon main supply is carried under the front seat. Full equipment is offered at the list price, including 12-inch bullet-type headlights. The car weighs, ready for the road, 2,300 pounds.

CROWN A KEROSENE CAR

Again a two-cycle car is to be placed on the American market if the plans of the Crown Motor Car Co., of Louisville, Ky., mature. Aside from the fact that the announcement marks the resurrection of an almost completely abandoned design of motor in passenger vehicle work, the new car will be a departure from standard practice in other respects, in that it is to have friction drive and is designed to operate on kerosene. But the crowning

feature of the Crown thirty, as it is to be called, is the price, \$350 with wood wheels or \$400 with wire wheels. This makes it the lowest-priced car in the market, with the exception of the three-wheeled Motorette.

Announcements of the Crown Motor Car Co. state that 10,000 Crown cars will be built during the coming year. The main plant is to be located in Louisville, but no building as yet has been secured. Some of the parts are to be obtained from three factories located in other cities.

According to the officials of the company, they have taken the bull by the horns in the matter of upkeep; for they naively state that they have "had in mind the many different parts that have been giving more or less trouble and have eliminated them from the car." Either gasoline or kerosene may be used as fuel, it is claimed, and the maker announces a guarantee of 30 miles per gallon on either fuel.

As to the mechanical details of the new car, it is to have a four-cylinder motor of the two-cycle type cast in block, bore 2 $\frac{1}{2}$ inches and 3 $\frac{1}{2}$ -inch stroke, with a five-bearing crankshaft and suspended at three points. The front axle is to be tubular and the rear axle floating. Springs are to be elliptic front and rear. Tires will be 28 by 2 $\frac{1}{2}$ inches and the wheelbase is to be 80 inches.

Two-passenger English type, fore-door, torpedo body is the dress in which the newcomer is to make its debut. The equipment is particularly worthy of note in a product at its price. This includes concealed door hinges and fastenings, electric lights throughout and the usual stock equipment of top, windshield, etc. Left steer and control are employed.

INCREASING TRUCK CAPITAL

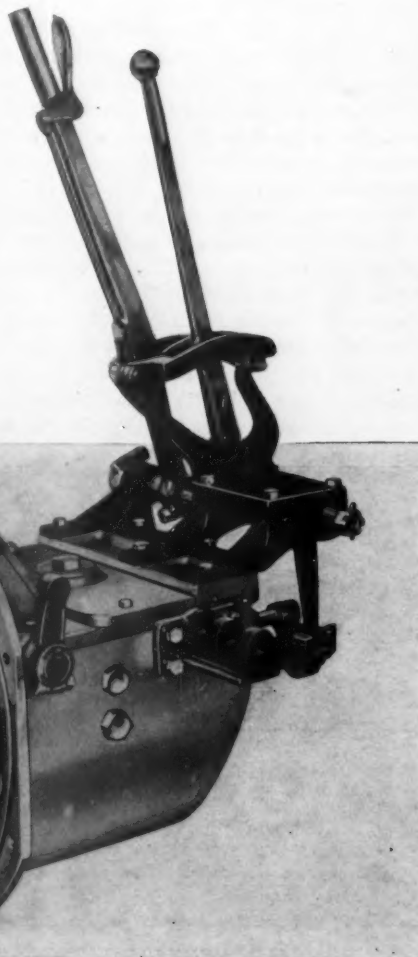
Detroit, Mich., March 17—At a recent meeting of the directors of the General Motors Truck Co., Pontiac, Mich., the capital stock was increased by \$250,000, all of which is owned by the General Motors

Co., of which the Pontiac concern is a subsidiary. Prior to this time the truck company simply was a selling company, but it now takes complete charge of its manufacturing. It is the successor to the Rapid Motor Vehicle Co., another General Motors subsidiary which has been discontinued. The General Motors Truck Co. was formerly capitalized at \$10,000, all of which was owned by the parent concern.



Fire Prevention

EDWARD F. Croker, for 25 years a New York fireman, and for the last 12 years of that time head of the department, as intelligent a fighter of fire, perhaps, as we have known, has offered the results of his experience and observation in a book entitled "Fire Prevention." Americans have carried the business of fighting fires to very great efficiency. We have the best machines, the greatest variety of helpful devices, and the most intrepid firemen in the world; but the total of our fire losses continues to increase and the per capita loss is far greater than among any other people.



CLUTCH AND GEARSET OF THE NEW TRIBUNE CAR

Fire fighters are doing their part; what is needed is a wider knowledge of the way to prevent conflagrations and to prevent the spread and damage from incipient fires. Chief Croker presents in his book by chapters such subjects as the prevention of fire in the dwelling and small town and the outlines of a department for a small town, the protection of lofts, factories, etc., protection of life in large buildings, sprinkler systems, and alarms.

Fire departments in general for large cities are discussed, and a special chapter is devoted to the New York fire department. A plea is made for high-pressure systems, and the fire-fighting proper ends with a discussion of the modern fire boat. Chapters on incendiarism and arson and the legal aspect of fire preventive work close the volume. The volume of some 350 pages is listed at \$1.50 and is from the presses of Dodd, Mead & Co., New York.

California Coast Trails

It is rather unusual in these modern days to pick up a book of travel that does not deal with motor cars, yet J. Smeaton Chase in his "California Coast Trails" departs from the conventional and tells of a most interesting ride from Mexico to Oregon that was made on horseback. Accompanied by an artist friend, the author rambled through this picturesque country, never in a hurry and enjoying every minute of the trip. The two equestrians saw old missions, and other objects of historical interest; camped out when they had to, and met old Dame Nature face to face. "Our object was to view at our leisure this country, once of such vast quiescence, now of such spectacular changes," says the author. "Especially we wished to see what we could of its less commonplace aspects before they should have finally passed away; the older manner of life in the land; the ranch houses of ante-gringo days; the Franciscan missions, relics of the era of the *parde* and the *don*; the large, slow life of the sheep and cattle ranges, and whatever else we could find lying becalmed in the backwaters of the hurrying stream of Progress." The book is well illustrated from original photographs and is published by the Houghton-Mifflin Co., Boston and New York. Price, \$2.

Cost Accounts

"Cost Accounts," by L. Whittem Hawkins, published by Gee & Co., London, Eng., was written for the purpose of teaching the manufacturer how to ascertain the cost of each article he produces. The systems outlined, both graphically and in text, enable the manufacturer to regulate the selling price of the articles he produces according to the cost. Methods of detecting flaws in the business circuit are described as well as systems for determining wherein the manufactured article may be produced more cheaply. Without a clear conception of the principles of double-entry bookkeeping, the book is understood only with difficulty.



The Motorist's Kindergarten

EDITOR'S NOTE—Motor Age is publishing in this department a series of non-technical explanations of the various parts of motor cars for the benefit of the reader who knows nothing about them. The subjects will be dealt with in the most elementary manner, so that the series when completed will form a simple elucidation of the car. The first article appeared October 10, 1912.

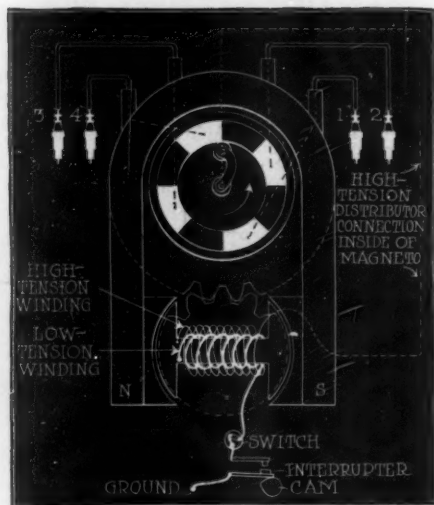


FIG. 44—HIGH-TENSION MAGNETO

ORIGINALLY magnetos were arranged to generate current at about 6 volts, this current was then led to a spark coil and transformed into high-tension current in just the same way that the current from the battery is stepped up. Many of them are arranged to work that way now. Such magnetos are called low-tension magnetos, because the current as it leaves the magneto is low-tension current. Such a one is shown in Fig. 45.

However, many makers of magnetos, in order to shorten the wiring and simplify the connections, have combined the spark coil with the magneto. Instead of having a separate core and separate primary coil, they have simply wound the secondary coil around the armature of the magneto, so the armature core acts as the core of the spark coil, and the low-tension winding on the magneto also serves the purpose of the low-tension or primary winding of the spark coil. Such magnetos are called high-tension magnetos, because the current as it leaves the magneto is high-tension current. Fig. 44 illustrates the principle of a high-tension magneto. The current is generated in the primary coil and a high-tension current is set up in the secondary winding. It is just like having a spark coil revolving between the poles of a magnet. The high-tension current is led directly to the distributor.

Ignition System

Where there is only one source of current for ignition, a dry battery, a storage battery, or a magneto alone, the system is called single system.

In order to make sure of ignition current, and particularly to make cranking

Five Ignition Systems

easy, most cars are supplied with both magneto and battery—usually a storage battery. A switch on the dash permits either source of current to be used, both going through the same distributor, usually, and both firing the same plugs.

Ignition systems in which there are two sources of current with one set of plugs are called dual ignition systems.

If the plugs should go wrong with the dual system, the ignition would be in as bad shape as if there was only one source of current. So to make sure that there will be no trouble on this score, some makers employ not only two sources of current, but two sets of plugs as well, letting the battery fire in one set of plugs or the magneto fire in the other.

Ignition systems in which there are two sets of plugs and two sources of current are called double ignition systems.

To make assurance doubly sure, a few cars are equipped with systems in which there are not only two sources of current and two sets of plugs, but two distributors as well. These are called double-distributor systems. This makes two complete systems, the only part common to the two being the switch, and often two separate switches are used.

Sometimes this switch is so arranged that either the battery or the magneto system may be used separately or together, one firing on one set of plugs and the other on the other set of plugs. This gives two sparks in each cylinder at the same time and at two different places in the cylinder. This makes it as certain as is humanly possible that there will be a

spark in the cylinder, and the two sparks in the cylinder increase the power of the engine, because the gas is ignited at two different places and gets burned more quickly. Such systems are called two-spark independent systems, and the firing is called multi-point ignition when both sets are worked together.

Ignition systems in which there are two sources of current, two sets of plugs and two distributors are called double-distributor systems, and when arranged to operate independently or together are called two-spark independent systems.

In some double-distributor systems the arrangement is such that either source of current can spark on either set of plugs alone or on both sets of plugs at the same time, but only one source of current can be used at any one time. Such systems are called dual-double systems.

Double-distributor ignition systems in which either current source can operate either set of plugs or both sets of plugs together, but only one source of current is available at a time, are called dual-double systems.

Operation of Dual System

In Fig. 46 at the right is shown the battery circuit of a dual system. It consists of a battery, a commutator or timer, and a coil. The circuit makes use also of the magneto distributor board. The commutator has as many segments as there are cylinders. The commutator usually is on a shaft. Running through the shaft is another shaft. As the camshaft revolves it turns the commutator shaft, which in turn revolves the arm. As the arm turns around it makes contact with the segments on the side of the timer.

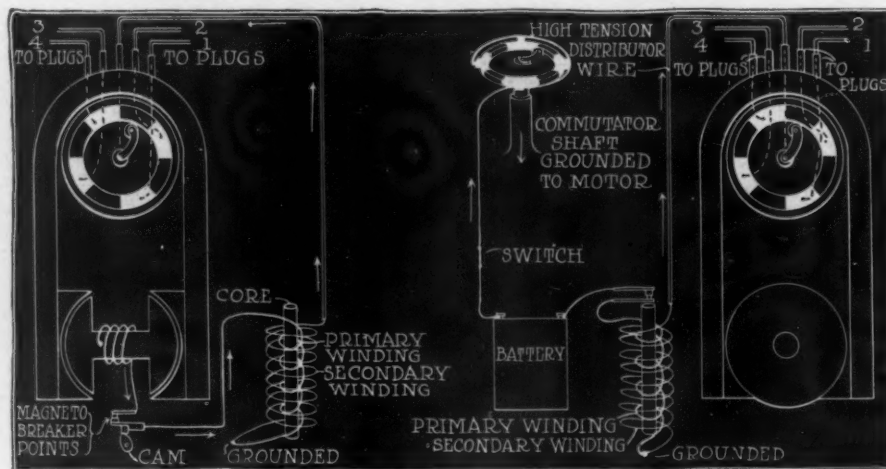


FIG. 45—LOW-TENSION MAGNETO SYSTEM FIG. 46—WIRING OF DUAL IGNITION SYSTEM. BATTERY CIRCUIT AT RIGHT. MAGNETO CIRCUIT SHOWN IN FIG. 45.

When the switch on the dash is turned to battery the current flows from the battery to the commutator ring. Now, this ring connects all four segments. It does not matter upon what segment the arm is resting. The only reason the segments are used is to pass the current on to the coil at given intervals, so that it will be raised in voltage at the proper time. To make this more clear, if the segments on the timer are the same distance apart as the segments of the distributor and the arms revolve at the same speed, then when the timer is making contact the current will flow through the coil. After leaving the coil the distributor takes care of the cylinder to which the current is to go.

To continue with the path of the current: It leaves the battery and flows to the commutator ring, and then it takes the shortest path it can. If the arm is in contact with a certain segment the current will flow through that segment and then through the arm of the timer. It goes down the timer or commutator shaft and tries to get back to the place where it was generated. In doing so it meets the ground wire. But the primary coil is the shortest path it can take, so it goes then through the primary coil. The coil leads the current back to the battery.

But in passing through the primary winding of the coil, which is placed usually on the dash of the car, the core is magnetized. This draws down the breaker the circuit is opened a high-tension current, thus opening the circuit, as explained in a previous article. This current is induced in the secondary winding.

Distributing the Current

This secondary or high-tension current is led through a wire called the distributor wire, to that part of the magneto called the distributor board. The word distributor is used because it is here that the current is distributed or sent out to the different spark plugs. The distributor wire is attached to the arm of the distributor. But this revolves and as it revolves makes contact with four segments, as shown in Fig. 46. These segments are connected by wires to the spark plugs. As the arm revolves, carrying current with it, it passes the electricity on the segment with which it is making contact. It goes then to the spark plug. The spark plug is grounded to the cylinder as previously explained. So the current is grounded at the spark plug. Now, the secondary coil is grounded, and it was in the secondary coil that the high-tension current was generated. Therefore the current will go straight from the spark plug to the grounded end of the high-tension winding. Thus the circuit is completed.

With the low-tension magneto there is no stored-up electricity as there is in the storage battery. The current is generated by virtue of the fact that an armature revolves in a magnetic field, as told in last week's article. Ordinarily, when the switch on the dash is turned to battery

and the motor started it is not permitted to run for any length of time on the battery. Instead, the switch is thrown to the magneto side. This cuts out the battery entirely, by opening the circuit, and makes the magneto current of value. As long as the motor revolves the magneto generates current. As soon as the motor stops the magneto ceases to give current.

When the switch is thrown to magneto with the motor running current is being generated in the armature of the magneto. This is passed to breaker points, as shown at the left of Fig. 45. The points are operated usually by a cam. This cam pushes one point against the other every so often. As soon as the cam goes down the points separate. The reason for having the breaker points is this: We all know that it takes a high-frequency current to be raised in voltage without any great loss. It was said in last week's article

that the magneto generates a low-frequency current. The breaker points opening and closing the circuit rapidly give the same result as if a high-frequency current were used. The current leaves the points to go through the primary winding of the magneto coil. That makes two coils on the dash, one for the battery and one for the magneto. As the current goes through the primary winding it induces a high-tension current in the secondary winding only when the breaker points have separated. The primary current of the magneto coil is grounded. The high-tension current goes through the distributor on high-tension wire to the distributor board of the magneto, where it passes to the plugs in the same way that the battery current was passed. In practice there is but one ground wire and one distributor, all the wires being connected in the coil box on the dash.

Manufacturers' Communications

OBTAINING GASOLINE ECONOMY

SYRACUSE, N. Y.—Editor Motor Age—

Economical operation with a six-cylinder car, or in fact any car, may be said to be attained when about 14 miles on 1 gallon of gasoline is the average over a fairly long period in the use of that car. Gasoline economy is but one of the many economies that can and should be worked for on a car. This is one reason why it never will be possible commercially to get the maximum economy of gasoline, as to obtain that maximum, it is necessary to sacrifice a good many other details that lead to a satisfactory car.

What is possible, however, is very seldom obtained by the average man, no matter what car he owns. This merely indicates that he has not the knowledge of the different things that go to make up economical use of gasoline.

Ignition is another factor of gasoline economy, and ignition should always be at a point that would give maximum power. How a man should drive is another important feature in securing gasoline economy. You easily can see that if the operator is holding out his clutch when going down a hill, and allowing the engine to run under its own power, he is using gasoline needlessly. If he holds out the clutch when he is slowing up the car, instead of closing the throttle, he is using gasoline needlessly. In fact every time the brakes are used on the car and the throttle not closed—and this can happen by holding out the clutch and leaving the throttle open—he is wasting gasoline.

The average man does not realize the importance of the needle valve. In all cases, this valve should be adjusted to the minimum possible and still have good operation. Adjusting this needle valve

to the minimum really means getting the right proportion of gasoline and air.

In the winter time the valve may be opened up to twice its regular opening in order to get good operation when everything is cold. It is very likely that if the needle valve is not closed down and the motor warms up, from two to three times as much gasoline is used.

Another big source of gasoline loss is in small leaks. Very frequently the gasoline valve or some of the unions leak just a drop now and then, but it amounts to a great deal in 24 hours.

Touring in the country gives the best possible chance for economical operation, as it allows the motor to be used at a more economical point in its power. At the same time, driving at high speed in the country does not give economical operation as far as gasoline is concerned because the wind resistance increases so fast that the amount of gasoline used in covering any particular mileage is very much greater than if that same mileage was covered at a slower speed. Probably 20 miles per hour represents the best speed for economical operation. Leaks in the suction yoke, and in fact anywhere in the line, affect the quality of the mixture.

Naturally the carbureter has a good deal to do with the gasoline consumption, but with a standard carbureter, there is not a great deal of difference in its use of gasoline. But there are quite a few things about a carbureter that can produce uneconomical operation, such as leaks in the float or air leaks around the carbureter, and for that reason it is very desirable to give this part enough attention to know that it is clean and in good operating condition.—Arthur Holmes, chief engineer, H. H. Franklin Mfg. Co.



From the Four Winds



GOVERNORS WHO MOTOR—McCREARY OF KENTUCKY

GOVERNOR JAMES B. McCREARY, of Kentucky, who is serving his second term after a lapse of 35 years, customarily rides around the capital in a coupe; but he enjoys motoring and frequently is seen on an excursion through the Blue Grass in the machine of a friend. It was on one of these excursions, returning to Frankfort late at night, when the gasoline gave out at a point on a hill overlooking the Dix river, fully 5 miles from any store.

A man with a lantern, walking across a field, was the only sign of life, and the governor's companion called to the man in the hope of borrowing a horse to get some gasoline.

"We're out of gasoline," he began, when the farmer reached the stalled machine.

"There's a barrel of it within a stone's throw," was the surprising rejoinder, and he explained that a camp meeting had been held near there and an over-supply of the life saving fluid had been left on a barge in the Dix river at the foot of the very hill on which they were stranded.

"It's McCreary luck," vowed his friend. Wherever your machine runs out of gasoline, there's sure to be a barrel stranded somewhere about."

"I always see to it that my machine never runs out of gasoline," responded the governor dryly.



GOVERNOR McCREARY OF GEORGIA

Recent Club News

AT the annual meeting of the Quincy Auto Club, of Quincy, Ill., new officers were elected for the ensuing year as follows: President, Jackson R. Pearce; vice-president, Lawrence Wells; secretary, Thomas N. Beatty; treasurer, A. Otis Arnold; board of governors, S. B. Montgomery, Harvey G. Riggs, J. W. Wall, A. H. Behrens, R. J. Christie, E. J. Taylor and R. B. Klefer. During the past year the club has assisted the creation of the Outer Ring boulevard around the city.

The annual meeting of the York Motor Club, of York, Pa., was held last Tuesday evening and the following officers were elected for the ensuing year: P. J. Gilbert, president; Harry Stauffer, first vice-president; John Kissinger, second vice-president; Stuart B. Lafean, secretary, and H. B. Gillespie, treasurer. The directors elected are P. J. Gilbert, Harry Stauffer, John Kissinger, Stuart B. Lafean, George Leber, E. S. Brooks and John P. Julius.

The Automobile Club of St. Paul will begin work May 15 on its new building at White Bear lake. The trustees and executive committee are devising ways and means to get \$35,000 for the proposed improvements. Twenty names have been added to the club since January 1, making the total membership 600.

A motoring association has been formed in Tangipahoa parish, Louisiana, including the principal towns in this parish. An official tour of the parish is being planned. O. W. Herring, of Amite City, is president of the association.

H. C. Roberts, the new president of the Peoria Motor Club of Peoria, Ill., has launched a movement for a club house. A structure to cost \$25,000 is proposed, to be erected 3 to 5 miles from the city on a picturesque site along the Illinois river, much frequented by motorists.

At the annual meeting of the Kenosha Automobile Club of Kenosha, Wis., all directors were re-elected, as follows: Charles T. Jeffery, John M. Kehlor, Dan O. Head, Walter J. Frost and Russell H. Jones. The officers were also re-elected, as follows: President, John M. Kehlor; vice-president, Walter J. Frost; secretary and treasurer, Russell H. Jones. The club is one of the largest in the northwest, having 235 members in a city of 30,000 people. The club is raising \$6,000 among its members to induce the permanent improvement of the Lake Shore road north and south of Kenosha to the county limits.



TENNESSEE'S Count—To date 10,460 cars have paid license in Tennessee.

Penn Passes 40,000—The 40,000-mark registered by the motor car division of the Pennsylvania highway department was reached last week. The number is within 20,000 of the aggregate for 1912.

Uncle Sam Fixing Park Road—News comes from the district forester at Ogden, Utah, that an appropriation for the Hoback canyon road within the Teton national forest has been made. It is thought that a sufficient sum has been set aside to complete that part of the road within the national forest, and if weather conditions permit, the work will be finished early in the spring. This will mean a great deal to transcontinental motorists desiring to visit Yellowstone park on their way to the coast.

Cadillac Agent Farthest North—The Cadillac Motor Car Co., of Detroit, now holds the distinction of having a dealer who is farther north than any other dealer on the American continent. A contract has just been closed with M. B. Potts, of Grouard, Alberta, Canada. Grouard is situated on Little Slave lake, which is several hundred miles north of Edmonton. While most people have a vague idea that this locality is in the extreme northwest and usually imagine it as only the home of a Hudson Bay Co.'s outpost or something of that sort, yet as a matter of fact Little Slave lake is in the center of some 500 acres of the finest grain land in the world. The establishment of a Cadillac dealer there is merely additional evidence of the

advancement of civilization in this direction and of the great rush to this far northern country, which will eventually be the source of a grain supply for the American continent.

Brazil Rubber Production—Rubber production in the Para, Manaus, Iquitos and Itacoatiara districts of Brazil amounted to 9,013,620 pounds for October, according to government statistics just received. This is an increase of 3,489,200 pounds over the September output and an increase of 3,864,740 pounds over the production of October, 1911. The exports were almost equally divided between the United States and Europe.

New District Regulation—A new police regulation has been put into effect in Washington, D. C., whereby motorists and drivers of other vehicles who violate the speed and traffic regulations at the intersection of streets will not be allowed to forfeit collateral, but will be obliged to stand trial in the police court. In practically all arrests of this kind the violators have been allowed to forfeit \$5 or \$10 as collateral. Hereafter, if they fail to appear in court they will be rearrested on an attachment or bench warrant and locked up or required to furnish ample bond for their appearance. The superintendent of police said he believed a great many traffic accidents are due to drivers disregarding the regulations at the intersection of streets. The new order, it is understood, does not affect the forfeiture of collateral for other violations of the motor car regulations. The district commissioners now have under

consideration a recommendation of the superintendent of police that three of the principal streets—Pennsylvania and Massachusetts avenues and Sixteenth street, be boulevarded.

Stops Skating on Road—So great has become the roller skating craze now being indulged in by both the adults and children of Louisville that the executive committee of the Louisville Automobile Club has framed an ordinance which seeks to prohibit skating on the streets in order to minimize the possibility of accidents.

Trinidad Using American Cars—American cars are used almost entirely on the British island of Trinidad, off the coast of South America. During 1912 an official statistics just published shows that forty-four cars were imported during the year. The popular preference is for a light car that does not cost over \$1,000, but some market exists for better cars, it is said. Extensive road improvement, which is being conducted throughout the island, is making the general use of cars more necessary.

North Dakota's Count—North Dakota issued a total of 8,888 motor car licenses during 1912. The license fees amounted to a total of \$26,664. Cass county issued the largest number of licenses, a total of 715 motor cars being registered in that county. Grand Forks county was second on the list with 607 motor cars registered there. Cass county collected \$2,295 in fees and of this amount \$1,847 was returned to

the county by the state. Oliver county stood lowest on the list with a total of only fourteen cars, and sixteen counties in the state had fewer than 100 cars at the present time.

Doctors Must Heed Law—Doctors rushing to save a life must not exceed the speed limit, according to a ruling of a New Orleans court. This has aroused considerable criticism, as fire apparatus en route to save property is allowed to travel at any speed desired.

Columbus Plans a Reliability—A 4-day reliability contest, which will be conducted under the auspices of the Columbus Automobile Club, will be run April 29 and 30 and May 1 and 2. The Ohio State Journal, of Columbus, originated the plan and the name will be taken from that publication. It has been decided to lay out the route from Columbus via Dayton and Richmond to Indianapolis, from Indianapolis to Ft. Wayne for the second day; from Ft. Wayne to Detroit on the third day, and from that point back to Columbus, the starting point, for the fourth day.

Can Foreclose Chattel Mortgage—A decision of importance to motor car dealers has been rendered by the state supreme court of Washington, which sustains the ruling of Judge Dykeman, of the King county superior court. Hortense P. King borrowed money from Elizabeth Worley to buy a motor car and gave a chattel mortgage on it. The Metropolitan Motor Car Co., of Seattle, sold the car and took a

conditional sale. The court decided that as the conditional sale was not recorded as the law required, the chattel mortgage can be foreclosed as a first lien on the machine.

More Chicago Contests—The Chicago Motor Club has completed its contest card for 1913, announcing that the season will open with an interclub match with the Illinois Athletic Club to Indianapolis and return May 29-31. The Algonquin hill-climb will be run June 10. The around Lake Michigan reliability has been restored to the calendar and will start October 4, going the reverse way. The truck demonstration will take place in April and later on in the season the Banta trophy run between the amateurs and tradesmen will take place.

Good Road Brevities

A CAMPAIGN has been launched to complete the good road between Louisville, Ky., and Nashville, Tenn., by constructing the last link along the Central Lincoln way. From the Larue and Hart county line to a point 6 or 8 miles southward lies the only piece of bad road between the two points. In this short distance is found the road that runs through Sand Hollow, which is religiously avoided by all motorists who have once traversed it. The sand is deep and the going is difficult at all times of the year. The Central Lincoln way passes through Bardstown, New Haven and Buffalo to Lincoln Farm. The other road in that direction, the Lincoln highway, passes through West Point, Elizabethtown and Hodgenville. The roads unite at Lincoln farm and from there follow the same route to Nashville, making a good thoroughfare.

In order to make permanent roads in the vicinity of the city of Natchez, Miss., \$131,000 has been ordered expended. Each of the principal roads out of the city will be improved for 1 or 2 miles, with the idea of carrying the work onward on each as rapidly as possible.

St. Martin parish, La., has authorized the expenditure of \$100,000 on good roads.

Appropriation by the Kane county, Ill., board of supervisors of \$2,000 towards the good roads movement assures the erection of 400 signposts throughout the county by the Elgin Motor Club. These posts will be of concrete, 9½ feet high and with a concrete base, 2½ feet in the ground. They will be topped with an iron rod extending 2 feet from the top, which will be surmounted by wooden signs 5 feet long by 6 inches in width.

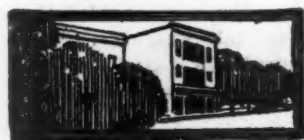
After an investigation by members of the Wisconsin highway commission and favorable reports from state engineers, the Sheboygan Automobile Club has voted to proceed with plans for the construction of a boulevard from Sheboygan to Sheboygan falls, 5.9 miles, at a cost of \$35,000. The club intends to raise that portion of the money ordinarily required by the state aid law to force the county and state each to pay one-third of the cost. The boulevard will be uniformly 18 feet wide, with 22 feet width at turns, and will be of concrete, with graded banks and macadam on either side, giving a total roadway of 25 feet. The share of club, county and state will be about 9,500 each, the remainder being contributed by townships.

Motor Vehicle That Defies Wintry Weather



BUILT FOR USE ON WINTER ROADS

Virgil D. White, who conducts a garage at West Ossipee, N. H., which is right at the base of the White mountains, and who is the agent there for the Buick, decided some months ago that he would not be hindered by snow and bad roads when he wanted to make trips in his car, so he devised a plan that is a fine example of Yankee ingenuity. The rear construction, or driving mechanism consists of two wheels on each side, bound by a 5-inch endless chain, the back ones acting as drive wheels from the engine, while the front ones work as a loose pulley to hold the chain out to make a track for the drive wheels. The front wheels are hung on an independent axle which is suspended from the body by a very light spring, thus allowing them to ride over the snow. The two axles are held in position by means of adjustable radius rods which make it possible to tighten or loosen the chains. The front construction or sled consists of an iron-tired wheel with a sled attached by means of two bolts which makes it possible to detach the runners in three or four minutes' time allowing the car to proceed on wheel in case of bare ground.



Among the Makers and Dealers



CROSS Is Holly Sales Manager—The Holly Bros. Co. announces the appointment of Charles W. Cross as sales manager.

Sixes Selling Well—The sales department of the Franklin Automobile Co. reports that the sale of sixes is 81 per cent ahead of last year at this time.

Milwaukee Concern in Trouble—An involuntary petition in bankruptcy has been filed by creditors of the Milwaukee Fiber Co., Edward J. Koch president and chief owner.

Rubber Plant Enlarging—The Canton Rubber Co., Canton, O., is planning to enlarge its plant and has petitioned the city council to acquire a small tract of city property located near its present plant.

S. M. Cooley Promoted—Samuel M. Cooley has been appointed general manager of the Prest-O-Lite Co. Mr. Cooley has been connected with the company for several years, and for the last 2 years has been assistant general manager.

Changes in Truck Company—The Available Truck Co., Chicago, has moved to a larger factory at 1539 North Forty-seventh avenue, installing new machinery and doubling its former capacity. John Rath is president and general manager, Edward F. King secretary and sales manager, and R. C. Blume treasurer.

Nashville Bidding for Plants—With the turning over of the \$20,000 site to the Automobile Mfg. and Engineering Co., the industrial bureau of Nashville, Tenn., feels that the way has been paved for other motor car manufacturing plants. Nashville is ready to offer special inducements for this class of industry, it is stated. The Automobile Mfg. and Engineering Co. has agreed to spend \$200,000 on buildings and equipment and to give employment to 500 persons. The company's plant at present

is in Detroit. Its product is the Evans Limited commercial car.

Brazil Does Not Raise Tariff—Publica-

tion has just been made of the new tariff schedule in Brazil and no increases were made on motor cars or on motor sundries.

Hartford Dealers Hold Election—Samuel A. Miner was elected president of the Hartford Automobile Dealers' Association last week. E. C. Clark was elected vice-president, H. D. Graves secretary, and H. P. Seymour treasurer. It was voted to hold a show in 1914.

To Pay Traveling Men—Judge Sater in the United States court at Columbus, O., rendered an opinion which made the claims of thirteen traveling salesmen of the Columbus Buggy Co., of Columbus, O., preferred claims and ordered that they be paid at once.

New Alliance Plant—The Alliance Motor Car Co., of Alliance, O., has purchased a site upon which will be erected a two-story factory building which will be used for the manufacture of motor cars. It is expected to have the plant completed soon after April 1.

Sternberg Company Election—At the annual meeting of the Sternberg Mfg. Co., of Milwaukee, manufacturing Sternberg commercial vehicles, all of the officers were re-elected, as follows: President, William Sternberg; vice-president, E. M. Sternberg; secretary, Victor L. Brown; treasurer, Robert L. Hayssen. Mr. Brown also was continued as general manager.

Maxwell Finishes Moving—W. M. Anthony, comptroller of the Maxwell Motor Co., Inc., has moved the executive offices of the concern all to Detroit, the accountants and others connected with this department all coming to this city last week. The general offices at Woodward and Warren avenues are now in full swing, and here will be handled all of the business of the big concern.

Four-Wheel Drive Expanding—The Four-Wheel Drive Automobile Co., of Clintonville, Wis., organized 3 years ago to manufacture commercial and passenger cars utilizing the Zachow-Besserlich patents for drive to both front and rear axles, is about to realize its long cherished plan of establishing a new plant. Several months ago the capital stock was increased from \$50,000 to \$250,000, and on March 1 the additional stock was reported sold. The board of directors in special session immediately voted in favor of starting at once upon the construction of a new plant to consist of three buildings, two of them to be 100 to 120 feet in size, and the other, a power plant, 60 by 80 feet in size. The buildings will be erected adjoining the present plant, the former Besserlich-Zachow machine shops, which will be used for patterns and warehouse. The Four-

Coming Motor Events

SHOWS

March 17-22.....Wilkes-Barre, Pa.
March 17-22.....Norfolk, Va.
March 19-22.....Springfield, Ill.
March 19-25.....Boston, Mass.
March 20-24.....New Orleans, La.
March 24-29.....Indianapolis, Ind.
March 27-April 3.....Quincy, Ill.
March 31-April 5.....Deadwood, S. D.
April 1-6.....San Francisco, Cal.
April 5-12.....Pittsburgh, Pa.
April 13-19.....Pittsburgh, Pa., commercial show

CONTESTS

*March 15-18—Reliability run, San Antonio, Texas.
April 14-16—Truck run, Chicago Motor Club, Chicago.
April 27—Hill climb, Limonest, France.
April 29-May 2—Reliability, Columbus Automobile Club, Columbus, O.
*May 5-8—Truck reliability of Washington Post, Washington, D. C.
May 11-12—Targa Florio road race, Sicily.
May 30—Interclub reliability, Chicago Motor Club, Illinois A. C.
*May 30—Indianapolis speedway meet.
June 21—Algonquin hill climb, Algonquin, Ill.
June 23-28—International road congress, London, Eng.
*June 25-29—Chicago Automobile Club reliability to Boston, Mass.
July 1—Indianapolis to Pacific coast tour; promoted by Indiana Automobile Manufacturers' Association.
July 1-16—Motor plow competition, Winnipeg, Can.
July 4—Track meet, Taylor, Tex.
July 4-6—Road race, Tacoma, Wash.
July 12—French grand prix.
*July 27-28—Tacoma, Wash., road race.
August—Elgin road races.
August 30-September 6—Reliability run, Chicago Motor Club.
September 1—200-mile track race, Columbus, O.
October 4—Start of Chicago Motor Club's around Lake Michigan reliability.
*November 24—Vanderbilt road race at Savannah, Ga.
November 27—Savannah grand prix. Sanctioned by A. C. A.

*Sanctioned by A. A. A.



GREAT WESTERN'S NEW BODY—EITHER A NINE-PASSENGER TOURING CAR OR AN AMBULANCE

Wheel company thus will be enabled to more than quadruple its output and will employ 500 men.

New Tire Concern in Canton—The Harper Tire and Rubber Co., Canton, O., recently incorporated with a capital of \$100,000, will manufacture a puncture-proof non-skid tire for motor cars. The name will be announced in a short time.

Putting Out New Carbureter—I. R. Reedy, of 1136 West Third street, Dayton, O., has invented a new carbureter which it is claimed will run a motor car at an angle of 60 degrees with its own supply. It is claimed to be adaptable for aeroplane use. A company is being organized to manufacture the carbureter and will be capitalized at \$50,000 under the laws of Ohio. An option on a west side building has been secured for a factory site. Mr. Reedy operates a garage at his Third street address.

Spark Plug Business Growing—A special meeting of the Rapp Mfg. Co., Toledo, O., was held last week for the purpose of authorizing a change of the firm name to the Toledo Spark Plug Mfg. Co. An increase in the capital stock from \$15,000 to \$25,000 also was voted at this meeting. Additional space in the Toledo factories building has been acquired and the plant will occupy three times its present floor space, while \$10,000 will be expended in new machinery to facilitate working conditions and provide means for a greater output. When the plant is enlarged and the new machinery installed it will have



THE JOPLIN TRANSFER CO., of Joplin, Mo., has found a novel way of using a truck and a team of horses in a sort of return combination. The firm bought a 1-ton Mack truck last summer and fitted it with a furniture body. On long hauls, the team and wagon are loaded and given a good start. Then the truck is loaded and reaches the destination about the same time. After unloading both vehicles, the team is marched solemnly up into the body of the truck, the wagon is hitched behind, and the whole affair goes bowling merrily back again. The plan has been tried to points as distant as Pittsburg, Kan., with great success. In fact, the horses like to ride so much that they frequently try to board the truck at the wrong time.

an output of 4,000 spark plugs a day.

To Sell Matheson Plant—Judge Whitmer in the United States court at Scranton, Pa., issued an order for the sale of the Matheson Motor Car Co. plant at receiver's sale April 23. Bids will be received at that plant on this date. They will then be compiled and handed to the court and the latter at a session in Williamsport, May 5, will decide to whom the plant shall be sold.

Packard Reports Big Business—The Packard Motor Car Co. states it now has on its books a greater volume of new business than ever before. Unfilled orders aggregate today more than \$5,000,000. These orders are for vehicles not merely sold to dealers. They are for Packards actually sold by dealers to customers. Inquiry letters sent out to all purchasers of left-drive Packards have failed to bring one reply unfavorable to left-drive.

Cleveland, O.—Cleveland Motor Trucking Co., capital stock, \$10,000; incorporators, J. C. Ross, C. A. Cochran.

Danbury, Conn.—Danbury Garage Co., capital stock, \$10,000; incorporators, S. M. Parmelee, H. A. Lake, R. J. Congalton.

Detroit, Mich.—Monarch Motor Car Co., capital stock, \$30,000; to manufacture motor cars; incorporators, A. J. Bloom, F. J. Priest, E. S. Wallace.

Decatur, Ill.—Dawson Automobile Co., capital stock, \$10,000; incorporators, E. M. Dawson, C. E. Dawson, F. L. Dawson.

Dover, Del.—Washington Motor Car Co., capital stock, \$300,000; incorporators, W. F. P. Lofland and others.

Dover, Del.—Knox Wyland Motor Car Co., capital stock, \$2,000; incorporators, O. E. Knox, W. J. Wyland, W. A. McCoy.

Frankfort, Mich.—Peck Motor Co., capital stock, \$100,000; to manufacture engines and motor parts; incorporators, J. F. Hoffstetter, C. Jacobson, F. O. Wickham, F. W. Peck.

Indianapolis, Ind.—Motor Starter Mfg. Co., capital stock, \$40,000; to manufacture starters; incorporators, S. M. Brundage, W. J. Sylvester, H. J. Herff.

Kingston, N. Y.—Brown Auto Supply Co., capital stock, \$7,000; incorporators, E. Brown, L. Brown, R. B. Osterhoudt.

Milwaukee, Wis.—Escott's Auto Livery and Garage Co., capital stock, \$15,000; incorporators, F. A. Escott, C. A. Escott, R. S. Witte.

Muncie, Ind.—Derrickson Mfg. Co., capital stock, \$125,000; to manufacture motor car accessories; incorporators, H. S. Osborn, H. L. Kesselman, B. C. White.

New York.—Seeing New York Automobiles; capital stock, \$10,000; to operate sight-seeing motor cars; incorporators, G. H. Mulligan, T. Frost, J. V. Fallon.

New York.—Associated Auto Mechanics, capital stock, \$100,000; to manufacture motor cars and parts; incorporators, C. Tichenor, H. Barnes, W. J. Hoover.

New York.—Henry Tobin Co., capital stock, \$50,000; incorporators, H. Tobin, R. T. Tobin, J. R. McDonough.

New York.—Peteler Shock Absorber Corp., capital stock, \$50,000; to deal in shock absorbers; incorporators, C. L. Moreau, F. D. Lyon, J. L. Allen.

New York.—Dayton Automobile Repairing Co., capital stock, \$5,000; to deal in motor cars; incorporators, C. E. Holste, V. Drummond, V. E. Mott.

New York.—Charles E. Hottum, capital stock, \$20,000; to manufacture motor car apparel; incorporators, C. E. Hottum, M. J. Hottum, W. H. Coffey.

Recent Incorporations

New York.—Whitestone Garage, capital stock, \$5,000; incorporators, J. A. O'Fee, H. A. Troiman, M. A. O'Fee.

New York.—Universal Shock Eliminator, capital stock, \$15,000; to manufacture shock absorbers; incorporators, R. Weed, E. Dreyfus, L. S. High.

New York.—New York Oil and Grease Co., capital stock, \$50,000; to manufacture and deal in lubricating oils; incorporators, G. T. Roberts, G. Carson, G. G. Francis.

Akron, O.—Summit Automobile Co., capital stock, \$10,000; to manufacture and deal in motor cars and vehicles; incorporators, E. J. Eblen, J. M. Sauder, F. L. Motz, R. Sauder, A. Elben.

Alexandria, Va.—Imperial Motor Tire Co., capital stock, \$100,000; incorporators, R. Carter, L. Carter, G. G. Lescher.

Alliance, O.—Alliance Rubber Co., capital stock, \$100,000; to manufacture and deal in rubber goods and motor car tires; incorporators, G. C. Russell, M. Bejach, W. H. Purcell, M. S. Melbourne, R. Auld, Sr., F. E. Dussell, H. F. Bobecker.

Altoona, Pa.—Central Motor Car Co., capital stock, \$10,000; incorporators, C. C. Baker, A. E. Akers, G. M. Smith.

Austin, Tex.—Texas Motor Car and Truck Co., capital stock, \$10,000; incorporators, J. C. Fink, A. A. Ritchson, W. T. Folts.

Boston, Mass.—Akron Tire and Rubber Co., capital stock, \$15,000; directors, A. Palder, M. Laserson, C. Braunstein.

Boston, Mass.—Westcott Motors Co., capital stock, \$8,000; incorporators, O. W. Nelson, H. L. Kemp, G. H. Learned.

Boston, Mass.—Androscoquin Motor Co., capital stock, \$10,000; incorporators, G. A. Pulsifer, W. G. Renwick, G. Hodge, Jr.

Brooklyn, N. Y.—Montauk Motor Co., capital stock, \$10,000; incorporators, L. F. Olise, J. K. B. Webster, M. Foster.

Brooklyn, N. Y.—F. and P. Auto Transportation Co., capital stock, \$70,000; incorporators, W. O. Goddard, F. K. Fairchild, G. A. Logan.

Buffalo, N. Y.—V. W. Bonham Mfg. Co., capital stock, \$20,000; to manufacture motor car pumps; incorporators, E. C. Schwingel, E. S. McCready, J. R. Pratt.

Charleston, S. C.—Arby Automobile Co., capital stock, \$200,000; incorporators, S. Sottile, M. R. Rivers, L. M. Pinckney.

Chicago.—Commercial Motor Service Co., capital stock, \$2,500; general transfer and moving business; incorporators, H. D. Bottum, C. M. Sly, A. D. Weiner.

Chicago.—Page-Lester Co., capital stock, \$2,500; to manufacture and deal in motor car accessories; incorporators, H. L. Page, M. Frisch, Anna Hess.

Cincinnati, O.—Armstrong Motors Co., capital stock, \$10,000; to manufacture and deal in motor cars and parts; incorporators, J. H. Armstrong, L. S. Armstrong, C. M. Eggers, C. S. Stewart, H. Bronsforth.

Cleveland, O.—Gustav Schaefer Wagon Co., capital stock, \$55,000; to manufacture bodies; incorporators, G. Schaefer, H. G. Schaefer, E. Schaefer, C. E. Moritz, A. Kruse, A. M. Schaefer.

Philadelphia, Pa.—Steve, the Tire Man, capital stock, \$10,000; incorporators, H. E. Pierce and others.

Philadelphia, Pa.—Morgan & Marshall Co-operative Rubber and Tire Co., capital stock, \$500,000; to manufacture tires; incorporators, R. J. Marshall, H. P. Marshall, M. Howells.

Pineville, Ky.—Cumberland Motor Co., capital stock, \$50,000; incorporators, N. J. Weller, A. W. Bryant, M. J. Moss, J. A. Pitman.

Pittsburgh, Pa.—Gibson Motor Car Co., capital stock, \$3,000,000; deal in engines; incorporators, J. H. Mahoney, E. D. Johnson, C. E. Gibson.

Racine, Wis.—Wisconsin Electric Co., capital stock, \$50,000; incorporators, L. Hamilton, C. H. Beach, W. W. Storms.

Richmond, Ind.—Sedgwick Mfg. Co., capital stock, \$10,000; to manufacture automatic lift; incorporators, R. Sedgwick, J. M. Judson.

Rossmore, Va.—Hunter Motor Co., capital stock, \$5,000; incorporators, J. L. Hunter, T. D. Hunter, J. E. Hunter.

Salt Lake City, Utah.—Deseret Motor Truck Co., capital stock, \$50,000; incorporators, I. Cole, D. Burns, J. E. Fiegle.

Thomasville, Ga.—Clark's Resilient Tire Filler Co., to manufacture tire fillers; incorporators, J. T. Clark, A. D. Clark, J. F. Golden.

Utica, N. Y.—Divine Tire Co., capital stock, \$225,000; incorporators, C. W. Wicks, A. J. Eckert, B. H. Divine.

Victoria, Tex.—Park Garage, capital stock, \$10,000; incorporators, J. Fraser, J. T. Linebaugh, W. H. Crain.

Waltham, Mass.—W. M. Caldwell Co., capital stock, \$5,000; conduct motor car business; incorporators, W. M. Caldwell, F. Jordan, T. F. Carey.



The Motor Car Repair Shop



At this time of the year the motorist is considering getting his motor car in condition for the spring, and as is the case usually, motor bearings are inspected, and if found defective they are scraped. To the average chauffeur or owner who takes care of his car, bearing scraping is a difficult matter and is turned over in most instances to the repairman. If, however, the proper facilities are at hand, bearing scraping is comparatively an easy matter for a man with some shop experience.

In order to properly scrape both the connecting rod and the crankshaft bearings, the crankshaft must be removed. There is a method for scraping the crankshaft or main bearings without removing the crankshaft, but this operation is too difficult for the average driver or owner.

The first step, of course, is to get the crankshaft out of the motor. This is done by first removing the motor, which has previously been drained of oil and water, from the frame and setting it on a jack. The flywheel is then taken off. The removal of the cylinders follows. All that remains on the jack is part of the crankcase with the crankshaft and pistons. In most cases the removal of the pistons is necessary. By dropping the lower half of the crankcase the crankshaft with the connecting rods may be removed. This should be placed upon the bench and the connecting rods removed.

Getting Initial Fitting

Of course, if the rods may be removed while in the motor, as is the case sometimes, it is advisable to do so. A means of holding the shaft upright on the bench must be devised. Usually on the end of the shaft there is a flange, with a number of holes drilled through. Place the flanged end of the shaft on the bench and mark on the bench with chalk the places under the holes. Drill holes through the bench where the chalk marks appear. Get as many bolts as you have holes, the bolts to be long enough to run through the bench

Bearing Scraping

Part I

Preliminary Steps

and have 1 inch left over. Put two big washers on each bolt. The object of the bolts is to hold the crankshaft on the bench in an upright position.

When in this position clean the shaft thoroughly with gasoline. Emery cloth should be used to rub down any cuts on the shaft. Take the connecting rod parts and immerse in gasoline. Then rub the parts dry. The connecting rods are numbered, and in working never put a rod in any but its proper position. That is, rod No. 1 should always be fitted to wrist No. 1, which is that nearest the front or crank-handle end. The connecting rods are ready now for an initial fitting. The crankshaft, which has been cleaned and emiered thoroughly, is blackened with lampblack on the wrist corresponding with the rod to be fitted.

Let us say that rod No. 1 is to be fitted. A little lampblack mixed with oil is rubbed on the wrist, with the finger. The rod is placed then in its proper position and tightened. In doing this be sure that the nuts are tightened as they should be. Many make the mistake of assuming that the nuts may be drawn up in any order whatever. This is wrong. First tighten one nut a little, then the opposite one a little, then a third one a trifle, and the one opposite to it is to be tightened just as much.

Then go back to the first one again. This order of tightening should be continued until all the nuts are tight and the bolts drawn up as much as possible without springing the bolts. The bolts are stretched very easily, so do not tighten them too much. When all the bolts have been drawn up turn the rod around in one direction for a while. Then run it back and forth for a few minutes, and then all the way around again. The entire opera-

tion of working in the bearing, as it is called, should last about 8 minutes. Then take off the connecting rod. A piece of clean cloth should be used to rub the surfaces of the rod bearing. Keep rubbing until the surfaces are cleaned as much as possible. The bearing will be covered with little black spots. Those spots were caused by the lampblack being imbedded in the soft metal of the bearing.

Battery Charging, Using Lamp Bank

An arrangement by which batteries may be charged is shown in Fig. 1. The batteries are connected in series, as shown, and a voltmeter inserted across the line, or in multiple. Six 110-volt carbon filament, incandescent lamps are arranged in parallel. One terminal of the bank goes to the batteries and the other to a safety bank as shown in Fig. 1. The usual charging rates is 3 amperes. For this reason the six carbon lamps are placed in the circuit in parallel.

Each lamp ordinarily consumes .5 ampere in a 110-volt direct-current circuit. The extra bank is in parallel with the big lamp bank, as a safeguard in case the current reading on the ammeter is not correct. It will be noticed that the ammeter is in series with the line. This holds true always. All ammeters should be placed in series with the line and all voltmeters across the line.

Since each carbon lamp consumes .5 ampere, the six lamps will take 3 amperes. If the switch leading from the lighting circuit is closed current will flow through the ammeter, through the bank, then to the voltmeter, and finally to the batteries. The ammeter reading should be 3 amperes. In the event that the ammeter is reading more than 3 amperes the extra bank may be thrown into the circuit by closing the switch. When the voltmeter reads 2.5 volts the resistance of the line should be decreased to about 1.5 amperes. This is done by removing 3 lamps from the bank. When the voltmeter again reads 2.5, charging is complete. Batteries should be charged every week, whether in use or not.

Spring Brake Adjustments

Touring time has begun and the limousine body is fast being set aside and the open type fitted to the car. Besides those cars which were in storage during the winter are being made ready for the warmer season. One of the most important things to examine is the brakes. Adjustments should be made according to the weight of the car. Usually the method of taking up on the brake rods consists of removing a clevis pin and tightening up the clevis. In all events the first time the car leaves the garage the brakes should be tried. See that pressure on the pedal causes both rear wheels to slide at once.

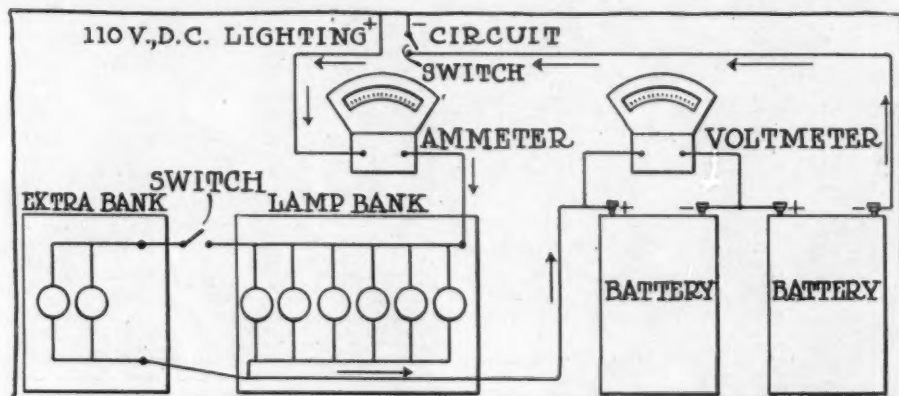


FIG. 1—ARRANGEMENT OF APPARATUS FOR CHARGING BATTERIES USING INCANDESCENT LAMPS AS RESISTANCE



Development Briefs

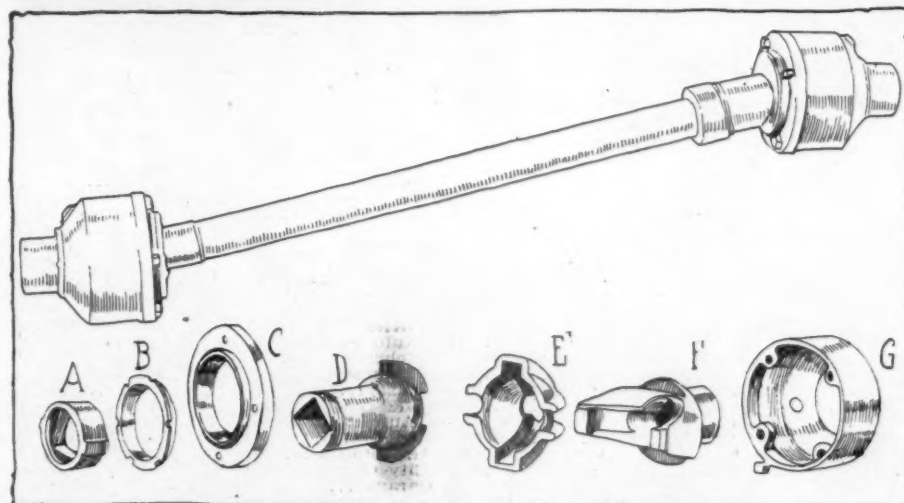


FIG. 1—PARTS OF FEENY UNIVERSAL AND COMPLETE DEVICE ASSEMBLED ON SHAFT

Starrett Ratchet Wrench

A wrench perfected by the L. S. Starrett Co., Athol, Mass., which overcomes objections to the ordinary form, is being marketed as the Starrett ratchet wrench. It is applicable to parts that are inconveniently located. It happens often that a nut must be tightened, but its position is such that the operation is both tedious and sometimes ineffective. The wrench is designed to do away with this inconvenience.

In Fig. 2 is shown the wrench and its various attachments. Part of the equipment consists of interchangeable steel sockets having a range from $\frac{1}{8}$ inch to $1\frac{1}{4}$ inch by steps of $\frac{1}{8}$ inch. Besides the sockets, a universal attachment for use in awkward places is supplied. A drilling fixture is given also which will hold drills varying in size from $\frac{1}{8}$ inch to $\frac{1}{2}$ inch. These contrivances, with the addition of a screwdriver attachment, make for a compact road-repair kit.

Feeny Universal

In Fig 1 is shown the parts of a universal manufactured by the Feeny-Hurd Co., Muncie, Ind., which is a departure from the spider type. The part D fits into E and the two flanges on the former ride in channels in E. The action between D and E results in an up-and-down movement. E is fitted into F and these two parts may move sideways.

Thus, the universal movement is gotten by the three parts D, E, and F. The three parts assembled are placed into the case G, and the cover plate C slipped over. The collars A and B are placed on the shaft, which in turn fits into the squared end of D. The shaft may move upward and downward by the action of D against E and sideways by E acting on F.

All the parts are drop-forged and ground to fit. A feature of the Feeny universal

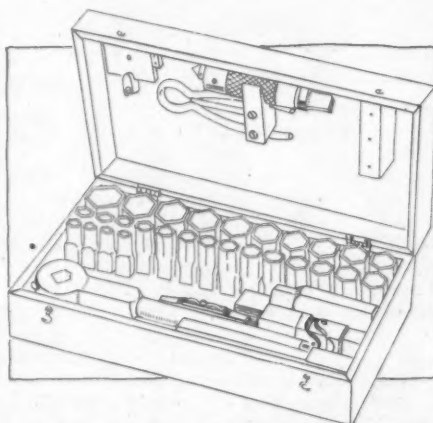


FIG. 2—STARRETT RATCHET WRENCH AND VARIOUS ATTACHMENTS.

is that it may be assembled or taken apart, either on or off the motor car, in a few minutes. The maker claims that this form

of universal has more bearing surface than the average joint in use, and that the flat bearing surfaces add greatly to its efficiency.

Prest-O-Primer

That gasoline does not vaporize readily at low temperatures is known. With this in mind, the Prest-O-Lite Co., Indianapolis, Ind., has taken advantage of the fact that acetylene is much more convenient for use as an agent for priming the engine. A device is being marketed under the name of Prest-O-Primer. It is illustrated in Fig. 3 together with the controller. The apparatus is used in connection with a Presto-lite gas tank.

In order to introduce the acetylene for priming into the cylinders at comparatively low pressure, a reducing valve is attached to the end of the tank. From it the line to the controller runs. The controller itself is at the upper right of Fig. 3. D connects by pipe with the intake manifold. E is connected with the reducing valve. The operation is as follows. The screw valve B is turned, which admits acetylene to the controller from the tank. The reducing valve dropping the pressure sufficiently to prevent injuring the cylinders when the explosion occurs. If the pressure of the gas were not reduced the explosion resulting would be so great as to injure possibly the cylinders.

With the gas in the controller the push valve C is pressed with the foot and the charge is sent to the intake manifold. When the engine is cranked or turned over by a starter the engine should be allowed to run on acetylene for a while. As soon as pressure on the push valve C is released the acetylene stops flowing to the motor.

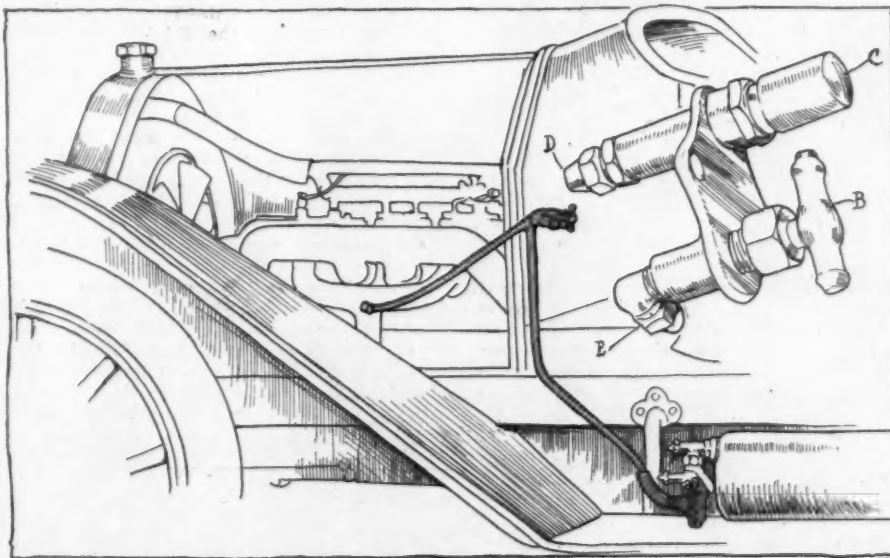


FIG. 3—PREST-O-PRIMER SHOWING CONNECTIONS TO INTAKE FROM CONTROLLER ON THE DASH OF THE CAR



Brief Business Announcements



Recent Agencies Appointed by Motor Car Manufacturers

PLEASURE CARS					
Town	Agent	Car	Town	Agent	Car
Adrian, Mich.	C. E. Simmons	Cole	Little Falls, N. Y.	N. B. Bronner	Cole
Asheville, N. C.	Enterprise Machine Co.	Cole	Louisville, Ky.	Reimers Motor Car Co.	Chevrolet
Baltimore, Md.	Cole Sales Co.	Cole	Milwaukee, Wis.	Cole Motor Co.	Cole
Bath, N. Y.	Wm. H. Hopkins	Cole	Moberly, Mo.	John N. Taylor	Cole
Bismarck, N. D.	Lahr Motor Sales Co.	Cole	Morris, Ill.	Osman Bros.	Cole
Breese, Ill.	The Breese Garage	Cole	Newton, Ia.	Barngrover Auto Co.	Cole
Carroll, Ia.	J. E. Osborne	Cole	Oakland, Cal.	W. J. Freeling	Cole
Charleston, Miss.	Thompson Anderson	Cole	Paterson, N. J.	Ford Auto Co.	Cole
Chattanooga, Tenn.	Hirsch Bros.	Cole	Pensacola, Fla.	Gulf Coast Garage and Sales Co.	Cole
Covington, Tenn.	Walter Haynie	Cole	Port Rich'm'd, L. I.	L. A. Silvie, Jr.	Cole
Crestline, O.	Crestline Garage Co.	Cole	Pueblo, Colo.	Tyler Auto Co.	Cole
Columbus, O.	Clintonville Garage and Auto Co.	Cole	Rapidan, Minn.	G. H. Schendel	R. C. H.
			Stockton, Cal.	J. Cal Skinner	Mitchell
Detroit, Mich.	R. C. H. Sales Co.	R. C. H.	Sacramento, Cal.	J. S. Casey	Cole
Eustis, Fla.	N. R. Herrick & Co.	Cole	Sherrard, Ill.	Kinsey & Danielson	Cole
E. Hampton, N. Y.	Halsey's Garage	Franklin	Springfield, Mass.	Shean Auto Station	Cole
Hammond, Ind.	Mrs. Laura Heintz	Cole	Watseka, Ill.	Burnham & Body	Cole
Hamilton, Ont.	The Patterson Auto Sales Co.	Cole	Wilkes-Barre, Pa.	D. & H. Auto Co.	Cole
Hartford, Conn.	M. J. Bliss	Cole	Winona, Minn.	Gate City Garage	Cole
Joliet, Ill.	S. J. Harrigan	Cole	Walla Walla, Wash.	City Garage	Baker
Keokuk, Ia.	Ayer Manufacturing Co.	Cole	Washington, D. C.	J. L. Creyke	Case
TRUCKS					
Auburn, Me.	E. L. Jordan	Stewart	Ottawa, Can.	Ontario Motor Car Co.	Stewart
Columbus, O.	Service Motor Truck Co.	Service	St. Paul, Minn.	E. F. Morgan Co.	Sternberg
Chicago	Foraker Motor Truck Co.	Sternberg	St. Louis, Mo.	Lewis Automobile Co.	Adams
Huntington, L. I.	Bergen Garage	Sternberg	Toronto, Ont.	Ontario Motor Car Co.	Stewart

WASHINGTON, D. C.—R. C. Creyke has opened a salesroom at 1801 Fourteenth street, N. W., and will handle the Case.

Indianapolis, Ind.—The Henderson Motor Car Co. announces the appointment of Harry W. Doherty as northwest district manager, with headquarters in Tacoma, Wash.

Washington, D. C.—The Motz Tire and Rubber Co. has opened a branch at 1012 Fourteenth street N. W., with Frank G. Fickling as manager.

Waterbury, Conn.—The Post & Lester Co. has opened a store here. W. H. Lewis, formerly assistant manager of the Bridgeport branch, has been appointed manager.

New York—The Bosch Magneto Co. has appointed as distributors Ballou & Wright, Portland, Ore., and E. A. Featherstone, Los Angeles.

Hartford, Conn.—Charles Schwitzer has been appointed chief engineer of the Columbia motor car division of the Maxwell organization. He has lately been connected with the Atlas Engine Co. at Indianapolis, Ind.

Minneapolis, Minn.—A branch of the Michelin Tire Co. has been opened at 1106 Hennepin street, which will take care of North and South Dakota, Minnesota and northern Wisconsin.

Spokane, Wash.—The Prescott Automobile Co. is the latest arrival to enter the business in Spokane. It is at 1024 First avenue. The Prescott company is the distributor in eastern Washington and northern Idaho for the Cartercar.

Hartford, Conn.—The factory office of the Pope Mfg. Co. has been removed to the quarters in the west wing formerly occupied by the postoffice department as a sub-station of the local postoffice. The space vacated by the factory office will be given up to the factory use.

Spokane, Wash.—The Harry L. Olive Co., Spokane Overland agent, has been incorporated. The name of the company will remain the same. Harry L. Olive was elected president, A. D. Plughoff vice-president, Arthur J. West secretary and R. A. Thelsen treasurer. The capital has been increased to \$100,000 and selling rights have been secured for practically double the territory for-

merly handled. The company will also handle the Garford line and the Willys utility wagon.

Milwaukee, Wis.—F. E. Bassett will be manager of the new Milwaukee Case branch opened last week at 495-501 Broadway.

Seattle, Wash.—The Washington Cartercar Co. has opened at 1515-17 Broadway. George J. Jenkins is president and L. V. Peck vice-president and secretary.

Washington, D. C.—The Cutting Motor Sales Co. has been formed to handle the Cutting, with salesrooms at 1532 Fourteenth street N. W. Robert H. Love is manager.

Beloit, Wis.—George W. Smith has organized the Beloit Vulcanizing Co. and established a tire and repair shop at 415 Broad street.

Findlay, O.—The United States Lock Co. is being formed in this city and within the next few days will be incorporated. It will manufacture a lock for motor cars.

San Francisco, Cal.—The Pacific Metal Products Co. and the F. L. Moore Motor Truck Co. have been consolidated under the former name, with a capital stock of about \$1,250,000. A large motor truck factory at Torrance, Cal., is projected.

Beloit, Wis.—William H. Gragg has purchased the Allen garage and business on Broad street from R. R. Allen & Sons. It was the first garage to be established in Beloit, having been built by Harry Vall in 1908.

Syracuse, N. Y.—C. W. Bull and T. A. Young have been appointed Franklin dealers here and have opened up a salesroom at 500 East Genesee street. Mr. Bull for the past year has been in charge of the Syracuse sales department of the Franklin Automobile Co.

Rhineland, Wis.—The Onelda Garage and Machine Co. has been organized at Rhineland by Will Gilligan and Edwin Priebe, and will open a garage and repair shop in the Litzell building. Agency lines have not been fully decided upon.

Detroit, Mich.—C. W. Thompson, of Rochester, N. Y., formerly connected with the Cutting Motor Car Co., has become identified with the Keeton Motor Co. as sales representative for the state of New York, covering territory east of Batavia, N. Y., and

the northern counties of Pennsylvania, with the exception of four counties in the northwestern section of the state.

Lake Charles, La.—A. S. Dudley and Guy Beatty have organized the Intercoastal Auto Co. and will handle the Overland.

Los Angeles, Cal.—The Pennypacker Engine Starter Co. has opened a new service station at 2210-12 South Main street.

Milwaukee, Wis.—C. H. Gray has been appointed manager of the Milwaukee branch of the Goodyear Tire and Rubber Co., 134-136 Onelda streets, Milwaukee.

Portland, Ore.—The Gerlinger Motor Car Co. of Portland has established a branch in Seattle. Arthur Hertz will be manager of the Seattle agency.

Moline, Ill.—R. W. Phelps, sales manager of the Great Western Automobile Co., has been appointed assistant sales manager and publicity man for the Moline Auto Co.

Findlay, O.—H. K. Boyles has purchased a half interest in the Main garage on North Main street from C. A. Burton, who was formerly sole owner.

San Francisco, Cal.—George R. Bentel has appointed Bert Latham as manager of the San Francisco branch of the Simplex-Mercer Pacific Coast Co.

Indianapolis, Ind.—F. E. Glass has joined the Oakes company in the purchasing department. H. J. Enders, former superintendent, has now become a stockholder and also has been appointed vice-president.

Birmingham, Ala.—One of the finest garages built in the south has just been occupied by the Cumberland Motor Car Co. Two showrooms, each 100 feet long, are provided.

Indianapolis, Ind.—The following have been elected officers of the Capitol Body Co: Elmer Hinshaw, president; Fred W. Henschen, vice-president; Elmer W. Hughey, secretary and treasurer, and W. A. Lyons, factory manager.

Louisville, Ky.—The following officers of the Sutherland Automobile Air Appliance Co. have been elected: E. J. Ashcraft, president and treasurer; Luke Sutherland, vice-president and manager; Walter B. Early, secretary.

The time you overhaul is the time to install— STROMBERG CARBURETORS



Last year you may not have experienced carburetor satisfaction. You may have *put up* with "flooding," "black smoke," uneven running, and *paid up* for a tremendous waste of fuel.

If you *have* been playing tinker to a "sick" carburetor it will interest you to know that

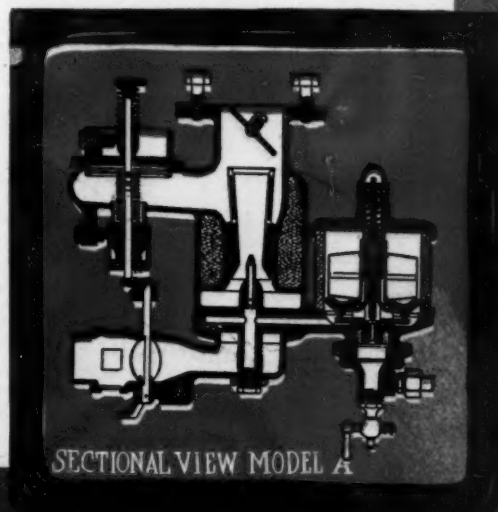
— You can take your car to any STROMBERG Service Station, or to any garage in the United States—have your old carburetor removed and an **Improved STROMBERG** substituted. For 30 days you may put that carburetor to any conceivable fair test. Try it out on the speedway—in muddy, sandy "going"—over hills—in the tropics or at the poles. Keep "tab" on your fuel bills. If at the end of 30 days the carburetor hasn't *sold itself*, bring it back and its full purchase price will be returned you. *We won't be satisfied unless you are.*

Start the motoring season *right*. This spring, when you have your car overhauled, take advantage of the STROMBERG 30 day Free Trial Offer.

Write for our "Reason Why" Booklet.

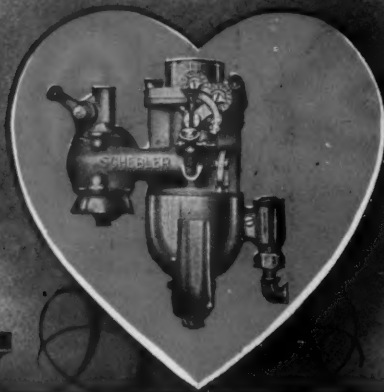
Stromberg Motor Devices Co.
64-68 East 25th St., Chicago, Ill.

BRANCHES:
NEW YORK MINNEAPOLIS DETROIT
INDIANAPOLIS BOSTON SAN FRANCISCO
Canadian Distributors: Russell Motor Car Co.,
Toronto.
Pacific Coast Distributors: Chanslor & Lyon Co.,
San Francisco.



SCHIEBLER

*The Aristocrat
of Carburetors*



"The Heart of the Automobile"

WHEELER & SCHIEBLER

"Pioneers in Perfection" of Carburetion

MANUFACTURERS
INDIANAPOLIS U.S.A.

THE SCHIEBLER IS THE ACKNOWLEDGED STANDARD CARBURETOR OF THE WORLD

Branches

NEW YORK
BOSTON
PHILADELPHIA
ST. LOUIS
MINNEAPOLIS
KANSAS CITY
CHICAGO

DETROIT
DENVER
SAN FRANCISCO
LOS ANGELES
SEATTLE
MONTREAL CAN.
SIDNEY AUSTRALIA

Service Department

Distributors

Every city and town in
the United States and
Canada • Europe and
Australia

Only one or two makers of high-grade cars are waiting

—waiting for their agents and customers to become still *more* insistent that their cars shall be Klaxonized.

The others have met this demand. Here they are. Check the list and see how complete it is.

A. E. C.	Chicago Electric	Lozier	Pratt
Alco	Church-Field Electric	Marmon	Schneider (European)
American	Cole (Special)	Matheson	Simplex
Armleder	Columbia	Metallurgique	Staver
Autocar	Davis	Multiplex	Stearns
H. H. Babcock	F. I. A. T.	National	Sternberg
Bailey Electric	Flanders	Nyberg	Stevens-Duryea
Benz	Hudson (Special)	Oakland	Stoddard-Dayton
Borland Electric	King	Oldsmobile	Touraine
Broc Electric	Knickerbocker	Orson	Guy Vaughn
Buffalo Electric	Knox	Packard (Special)	Walker Electric
Roadster	Lancia (European)	Pierce-Arrow	Ward
Charon (European)		Pope Hartford	White

THE Klaxon is the out and out choice of 150,000 motorists. It meets the spirit and intent of all warning signal laws. Not only those of States requiring an "adequate" signal but,—more important still—the recent ordinances of Chicago, St. Louis, Los Angeles, Newark, Dallas, and many other cities which rule more specifically against the out-of-date bulb horn by demanding an "abrupt sound, sufficiently loud to be heard under all circumstances."

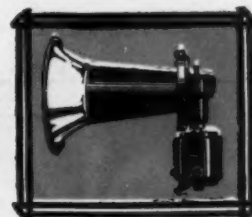


KLAXONET

Lovell-McConnell Mfg Company Newark, N.J., U.S.A.

KLAXON

"The Public Safety Signal"



KLAXON

Stock
Champion*National*International
Champion

For Conservative People

—who want the best, who will pay only a price commensurate with quality—this is the car of reliability, safety and luxury.

"Mother, this is the car for you and the family. It's dependable, safe, easy to control, simple to run, and comfortable. It's a car we'll be proud to be seen in. It's a car I'll feel satisfied to have you or the young folks run, because it's really a 'button car.'"



The National is a "Button Car" that appeals to a woman

She steps directly from her home into her luxurious National. She touches one button and starts the motor. She touches another button for the electric lights. She has immediate, quick, convenient control of the entire car. She goes at will, in comfort, safety and privacy, shopping, calling, to the theatre, anywhere. She has splendid reserve power and perfect mechanical construction at her command.

Electric Starter, Electric Lights, Left Side Drive, Center Control

WRITE FOR CATALOG

Five Models, \$2750 to \$3400

National Motor Vehicle Co., Indianapolis, Indiana

At Boston Automobile Show

259 cars were exhibited with
ELECTRIC LIGHTING or STARTING or both



STORAGE BATTERIES

were installed on

184

showing that

71.5%

of the manufacturers who exhibited have selected the **CLBA** because of its superior merit.

CLBA SUPREMACY was demonstrated at the three big shows, as follows:

New York.....	277 cars exhibited.....	188 with CLBA Batteries.....	67.9%
Chicago.....	242 cars exhibited.....	185 with CLBA Batteries.....	76.4%
Boston.....	259 cars exhibited.....	184 with CLBA Batteries.....	71.5%

Use Class A **CLBA** Battery with an Electric Lighting Generator
Use Class B **CLBA** Battery with an Electric Self-Starter

Write us for full information

Willard Storage Battery Co.
CLEVELAND, OHIO

New York Branch: 136 W. 52d St.
Detroit Branch: 1191 Woodward Ave.

Chicago Branch: 2241 Michigan Ave.
San Francisco Branch: 243 Monadnock Bldg.

Depots in all Principal Cities in the United States, Canada and Mexico

OPEN LETTER (NO.2) FROM



MAXWELL MOTOR COMPANY

INCORPORATED

DETROIT, MICHIGAN

March 15, 1913

SUBJECT: WHY WE CHOSE THE NAME MAXWELL.

Gentlemen:-

This is the second of the series of letters in which I promised to treat frankly and fully with every phase of our policy, and give you, as directly interested parties, the reasons why.

In letters and in personal conversation, many dealers have asked, "Why did the reorganized company adopt the name Maxwell for the whole line of cars?" So I will answer that.

In a word, the reply to the question is: Because that name stands for more than any other name we had a right to use.

Now to elucidate: We could have used, an entirely new name, with all the lost motion that involves in the way of establishing a new product and a new name in the public and trade confidence.

More, it would have left us open to the accusation of adopting a new name so as to avoid responsibility with regard to past models made by the various companies that are now incorporated in this concern.

So that was not to be thought of.

Or, we could use rightfully the following names: Stoddard-Dayton; Maxwell-Briscoe; Sampson; Brush; Courier; Flanders.

Let's consider the last name first, since you would naturally suppose I would like to see my own name on the product.

The name Flanders on a motor car is confused in the minds of the public. To some it means E-M-F (E.M. Flanders), to others Flanders "20" and to still others Flanders Sixes. Not to mention Flanders Electrics, which were made by an entirely different concern, tho the public has never known the difference.

Now to be frank, on only one of the above mentioned cars does the name mean anything today. E-M-F "30" and Flanders "20" are really Studebaker cars. I have had no active connection with that concern for more than a year.

So the only cars now out, on which the name stands for anything

MR. FLANDERS TO DEALERS

are the Flanders Sixes—and there were less than 100 of these cars in hands of users when the Flanders Motor Company was absorbed by purchase by this concern.

Now consider this: There were in hands of owners more than 100,000 cars known as "Maxwells".

That was more than all the cars that had been made by all the other concerns combined—Stoddard-Dayton, Brush, Sampson, Flanders, etc.

And Maxwell cars were always honest cars.

So were all the others—but the grounds on which we selected the name were the number of owners to whom we felt the new company owed allegiance and service.

And we also considered the dealers who have sold so many Maxwell cars. Would it be fair to them to adopt any other name?

Maxwell dealers were always loyal—why ask them to transfer allegiance from a name to which so much sentiment as well as success was attached?

Looking at the matter from a purely business standpoint, do you not agree that we selected the best name—the name that stands for more in the trade and means more in the way of a guarantee of good faith to old customers on the part of the new company.

Here let me assure all dealers who sold and persons who now own Stoddard, Brush, Sampson, Flanders and any of the other cars formerly made by the companies which now constitute the Maxwell Motor Company, that we feel we owe the same loyalty to them. We will continue to make and promptly furnish replacement parts for all former models—so they remain current as the latest coined dollar.

I am sure we selected the best name, and when you have considered it from every angle, I know you will agree.

Yours very truly,

MAXWELL MOTOR COMPANY (Inc)

Walter E. Flanders.
President and General Manager,

P.S. In the next letter I will explain "Why we did not use all our plants."

Stewart Speedometer vs. MAGNETIC PRINCIPLE

The Rise and Victory of The Magnetic Speedometer

*Over 95% of all the Speedometers to be made
during 1913 will be built on the prac-
tical magnetic principle*

Increase of the Magnetic Type

10% of the speedometers made 5 years ago were magnetic

15% of the speedometers made 4 years ago were magnetic

50% of the speedometers made 3 years ago were magnetic

70% of the speedometers made 2 years ago were magnetic

85% of the speedometers made 1 year ago were magnetic

*208 out of 214 automobile manufacturers are now using
the magnetic speedometer*

The Stewart Speedometer Factory

1931 Diversey Blvd., Chicago, U. S. A.

International Service

Service Stations In All Principal Cities All Over The World

the Centrifugal Speedometer

The Decline and Fall of the Centrifugal —or Gyroscopical—Speedometer

*Only 5% of all the speedometers to be made
during 1913 will be built on the obsolete
centrifugal or gyroscopical principle*

Decrease of the Centrifugal Type

90% of the speedometers made 5 years ago were centrifugal

80% of the speedometers made 4 years ago were centrifugal

50% of the speedometers made 3 years ago were centrifugal

30% of the speedometers made 2 years ago were centrifugal

15% of the speedometers made 1 year ago were centrifugal

*Insist on a Stewart (magnetic) Speedometer on your car
It means satisfaction and service*

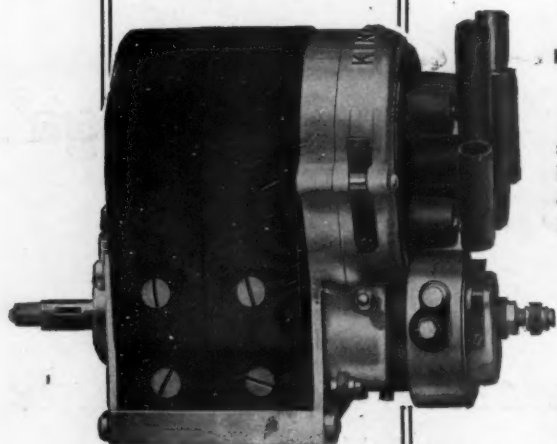
The Stewart Speedometer Factory

1931 Diversey Blvd., Chicago, U. S. A.

International Service

Service Stations In All Principal Cities All Over The World

Overhaul Your Car— INSTALL KINGSTON IGNITION DEVICES



Model "B" Magneto

Perhaps your car has lost its snap. It "misses," "lags," overheats, runs erratically, leaks current. **It shouldn't.** Your ignition needs looking into.

When your car is overhauled this spring leave instructions that your ignition is to be **KINGSTON**. Tell the garage man that you are going to find out what is in the **KINGSTON** Guarantee of Perfect Service Satisfaction.

If **KINGSTON** Ignition Devices will inject new life into your car—you want to know it. If they shouldn't do all that is claimed for them—a company which has been doing business on a "make good" basis since the automobile industry began protects you. **You can't lose.**

Tell your ignition troubles to our Motorists' Service Department. It will solve that problem which has been fretting you.

The leading member of the **KINGSTON** Specialty family for 1913 is the improved **KINGSTON** Magneto. **KINGSTON** Magneto is made in different types for all purposes—for high or low tension currents—for light or heavy duty. **KINGSTON** Ignition Specialties include spark plugs, coils for all purposes, switches, dashboard transformers, and other ignition devices.

Write for Catalogue

Kokomo Electric Company

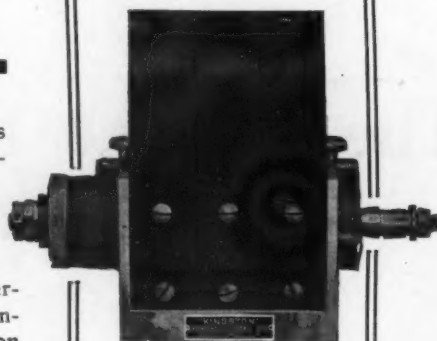
KOKOMO INDIANA

BRANCHES:

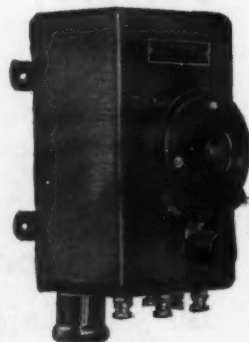
CHICAGO.....1430 Michigan Ave.
DETROIT.....650 Woodward Ave.
NEW YORK.....1733 Broadway
LOS ANGELES.....804 S. Olive St.



Kingston Switch



Model "E" Magneto



Dash Board Transformer

A. L. A. M.
Standard Plug

The Class Journal Company

THE
AUTOMOBILE
NEW YORK

PUBLISHERS
239 WEST 39TH STREET
New York

MOTOR AGE
CHICAGO

SUBJECT
My Last Letter.

Mr. Car and Accessory Mfr.,
Alive Street,
Busytown.

Dear Sir:

I have taken quite a little of your time and a great deal of my own with this series of letters.

And this was not so much to try and persuade you just to use The Automobile and Motor Age, as it was to make you appreciate their real value and use them as they should be used.

For, owing to the general good natured habit of most manufacturers of taking "space" in trade papers largely as a matter of course, solicitors have never been forced to bring home to many manufacturers any appreciation of the actual money value to him of his advertisements in The Automobile and Motor Age.

In attempting to do just this, I have tried hard to analyze for you the fundamental reasons for the peculiar value that I know these mediums offer in a wonderful degree. And particularly have I tried to keep my argument on a basis of common sense, every-day-fact, so that you, from your own observation, could check off for yourself, point by point, every single step in my reasoning.

This letter is the last. I wonder, now that I am through, if you won't write me a letter.

Would it be asking too much of you, I wonder, to suggest that you read over my arguments in this and in many of my previous letters as you may happen to have on hand, and let me know, as frankly as you will, whether you think I have made my case clear. And if not, wherein I have failed to interest you.

Yours truly,

Condi West
Read the two following pages

Have you read the letter on the preceding page addressed to you?

No. 1. Experience Breeds Contempt

"The men who continue to grow and become really great are the few who never lose the habit of close inquiry, who never forget that each day brings some new force or some new application of an existing force inadequately used."

No. 2. A New Automobile Club

"A new automobile club of 40,000 members is so anxious for information about cars and accessories that they have assessed themselves \$120,000 a year to secure it. Through the Automobile and Motor Age, the opportunity of addressing their weekly meetings is open to the automobile manufacturer."

No. 3. Class Circulation

"With as much certainty as if you had actually seen every one of them taking his car from the garage, you are forced—unless you deny altogether the law of motives—to the conclusion not simply that every subscriber to the Automobile and Motor Age is interested in automobiles and accessories but that each and every one is an actual user."

No. 4. Individual No. 10

"No manufacturer alive to his opportunities would overlook even for a moment any force that would enable him to pass rapidly by Individual No. 1, No. 2, No. 3, No. 4, No. 5, No. 6, No. 7, No. 8, No. 9—the nine who cannot or will not buy from him—and go directly and only to Individual No. 10—who is not only willing but eager to buy. For manufacturers of cars and accessories just such forces are The Automobile and Motor Age."

No. 5. Who and Why

"Men don't read The Automobile and Motor Age for political news, baseball news, fiction, financial news, verse, general news—they do not contain a paragraph of such matter. Only one group of men reads them and with only one common interest—automobiles. Therein lies the extraordinary value of these publications to automobile advertisers."

No. 6. A Waldorf Flower Stand

"Just as the flower vendor, the automobile manufacturer can stand on the curb, so to speak, and solicit every miscellaneous passerby, or he can utilize some means—a stand in the Waldorf—that will automatically sift out for him possible buyers. The Automobile and Motor Age are "Waldorfs" for the automobile manufacturer."

No. 7. Certification

"The unquestioned leadership of The Automobile and Motor Age naturally brings a good deal of comment from the advertising representatives of other papers in the same field. Though seldom vicious, their statements are almost always glaringly inaccurate. You may take these random statements of rival solicitors or the certified statement of an eminent public accountant."

No. 8. Expert Advice

"This is the age of specialized knowledge. When men seek expert advice in trivial matters, easily understood, think how much they must depend upon the expert in the complex and expensive matter of selecting an automobile. The circulation of the Automobile and Motor Age is made up of those who not only buy but really know automobiles. To convert that circulation to your interests, is to enlist in your service 40,000 volunteer dealers!"

No. 9. Unanimous Judgment

"Other worthy publications there are of the class journal type. But see to it that you use first and adequately those two which, by a ballot of paid advertising pages, are voted best:

- not only by the combined judgment of the New England advertisers;
- not only by the combined judgment of the Middle Atlantic advertisers;
- not only by the combined judgment of the Michigan and Ohio advertisers;
- not only by the combined judgment of the Chicago and Western advertisers;

but by the combined judgment of the united manufacturers of automobiles and accessories from Maine to California. When in doubt, you may care to take counsel of the composite wisdom, the composite judgment of the combined automobile manufacturers of America."

No. 10. Quintessence

"A pound of violet petals is worth a few cents; a pound of 'quintessence' sells for \$1,363. General magazine circulation is like the violet petals; along with a tiny bit of essence comes a mass of stems, pistils, fibre. In our class paper circulation, all these waste products have, at infinite labor and expense, been eliminated. There remains only the quintessence of the circulation you seek."

No. 11. Mr. A and Mr. B

"The vast majority of car owners—not so well informed—look to a small but powerful army of expert amateurs to guide them in the purchase of their cars and equipment. When you talk to the 40,000 subscribers to The Automobile and Motor Age, you reach that audience of automobilists, expert and enthusiastic, who select cars not only for themselves, but for their friends. To any manufacturer of motor cars or accessories, clients like these are veritable nuggets of gold."

No. 12. A Sleepy Contractor

"If 40,000 men, one after another grabbed you by the coat sleeve and whispered into your ear "We—40,000 of us—are about to buy cars, carburetors, tires, horns, spark plugs, oil and all the other things that are used in the fitting out and keeping up of a car" would you fail to get in a bid for your share of this vast business?"

No. 13. The United Publishers Corporation

"Between the leader and the leech; between the class paper that feeds its advertisers, and the paper that feeds upon them, you have daily opportunity to choose! You can help support those men who are throwing together a few pages of indifferent reading matter as a bait for as many pages as possible of paid advertising matter. Or you can co-operate with those institutions, those men with the character, ability, courage and financial resources to serve you with trade organs of powerful efficiency."

No. 14. When 40,000 Motor Car Owners Go Shopping

Now, in the chain of argument—a summary of my preceding letters—I ask you to examine each link as carefully as you can to determine exactly how it fits together with the next link, and then to tell me frankly whether you think the chain I build for you is not as sound as steel itself and of as careful welding as ever made a chain.

Save $\frac{9}{10}$ of Your Tire Repair Expense



For 2 cents you, yourself, can **permanently** repair every puncture or ordinary blowout in tube, or cut in casing. Easier, quicker and better than vulcanizing. Costs one-tenth as much. No heat or tools needed. Nothing but your two hands and



Use the Tire-Doh Outfit anywhere—in the shop or on the road. Cut your tire repair expense down to almost nothing. Tire-Doh means freedom from big tire repair bills and annoying delays. Double the life of your casings by promptly repairing cuts and blisters with Tire-Doh.

The Outfit comes only in white enameled can, as shown above, and consists of one can of Tire-Doh and one can of Tire-Doh Cement. Neither Tire-Doh nor Tire-Doh Cement is ever sold separately or under any other label.

Price now \$1. Just as much Tire-Doh as in the old \$2 Outfit. Ask your dealer for a Tire-Doh Outfit today. Or send us \$1 for a Tire-Doh Outfit express prepaid. You run no risk. Money back if you ever ask it. But insist upon genuine Tire-Doh if you want our money-back guarantee.

ATLAS AUTO SUPPLY CO., 3243 W. Lake St., Chicago

BRING YOUR OLD CAR UP TO DATE-BY INSTALLING A



Electric Headlight Outfit, \$40

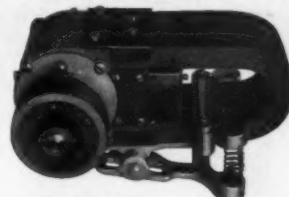
Complete Outfit—Electric Generator, Headlamps, Switch Wire and Bulbs



EASY TO INSTALL ON ANY CAR having exposed fly-wheel or other place to belt or friction drive the generator. **LIGHT WEIGHT**—Generator weighs but 18 lbs. Compare it with the heavy, complicated and costly charging outfits. If you have the Electric Head Lamps get the K-W Electric Generator; only \$25. Can be used for ignition in connection with timer and spark coil.

Handsome—Made-for-the Purpose Head Lamps \$15 and \$17

No extra charge for black finish. The most efficient electric head lamps made.



ELECTRIC GENERATOR \$25

K-W Ford Electric Head Light Outfit, \$15

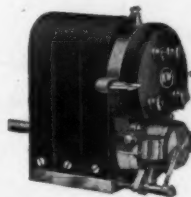
FOR CARS WITH FLYWHEEL MAGNETO

The successor to the gas tank. The most successful electric headlight outfit for Ford cars because it is especially designed and engineered to work in connection with the Ford Flywheel Magneto. Send a postal for descriptive folder.

The K-W High Tension Magneto

For all cars having provision for Magneto We make larger Magnetos for larger engines. High Tension Magnetos are for Ignition only. Use Low Tension for Lights. If you cannot gear-drive a High-Tension Magneto, use one of our Low Tension belt or friction-drive Magnetos and a K-W Spark Coil. Write for details.

Model J
Guaranteed
to Start
Auto
Engines up
to 30 H. P.



No Coil
No Timer
No Batteries
4 Cyl., \$50
6 Cyl., \$55

Why the



Master Vibrator?

Because It Will Positively Give You



Price \$15

A Hotter Spark
A Smoother Running Engine
Easier Starting

More Power
Less Carbon Deposits
Cleaner Spark Plugs

Over 36000 Ford Owners Have Installed Them

And more are doing so every day. Watch the number grow monthly. **OUR GUARANTEE:** Try the K-W Master Vibrator for 30 days and if you can get along without it return it and we will send your money back and ask no questions. Send for descriptive folder.

Be Sure to Get
Take No Other



and
Have That

SATISFIED FEELING



We make a complete line of ignition apparatus. Don't simply ask for catalog. Tell us your troubles and we will help you.

THE K-W IGNITION CO.
2835 Chester Ave.
CLEVELAND, OHIO, U.S.A.

WE PAY THE EXPRESS
East of the Mississippi River on any of our goods, when cash accompanies the order.

Agents in Principal Cities: New York, E. J. Edmond, 1738 Broadway; Boston, W. J. Forbes, 243 Columbus Ave.

New Departure Ball Bearings

American-made for American Trade

A review of the 1913 models of American built pleasure cars exhibited at New York and Chicago demonstrates a marked increase in the use of ball bearings in preference to those of other types.

If it is desirable to mount rotating parts upon a journal possessing less friction and requiring less work to drive than does the plain bearing, it is only reasonable to use that type of journal possessing the least friction, requiring the least power to drive, and, therefore, the most efficient.

The ball bearing is ten times as efficient as a roller bear-

ing under same load conditions, and thirty to fifty times as efficient as a plain bearing.

The American made New Departure is the quality bearing of the world. This bearing is to be found in 80 per cent of the cars manufactured for 1913 selling.

See the New Departure demonstrated at the Boston Show, Space Number 430, Balcony, March 8th to the 15th.

A pamphlet discussing the relative success of all types of bearings in eliminating friction is now on the press.

Send for your copy today.

AMERICAN

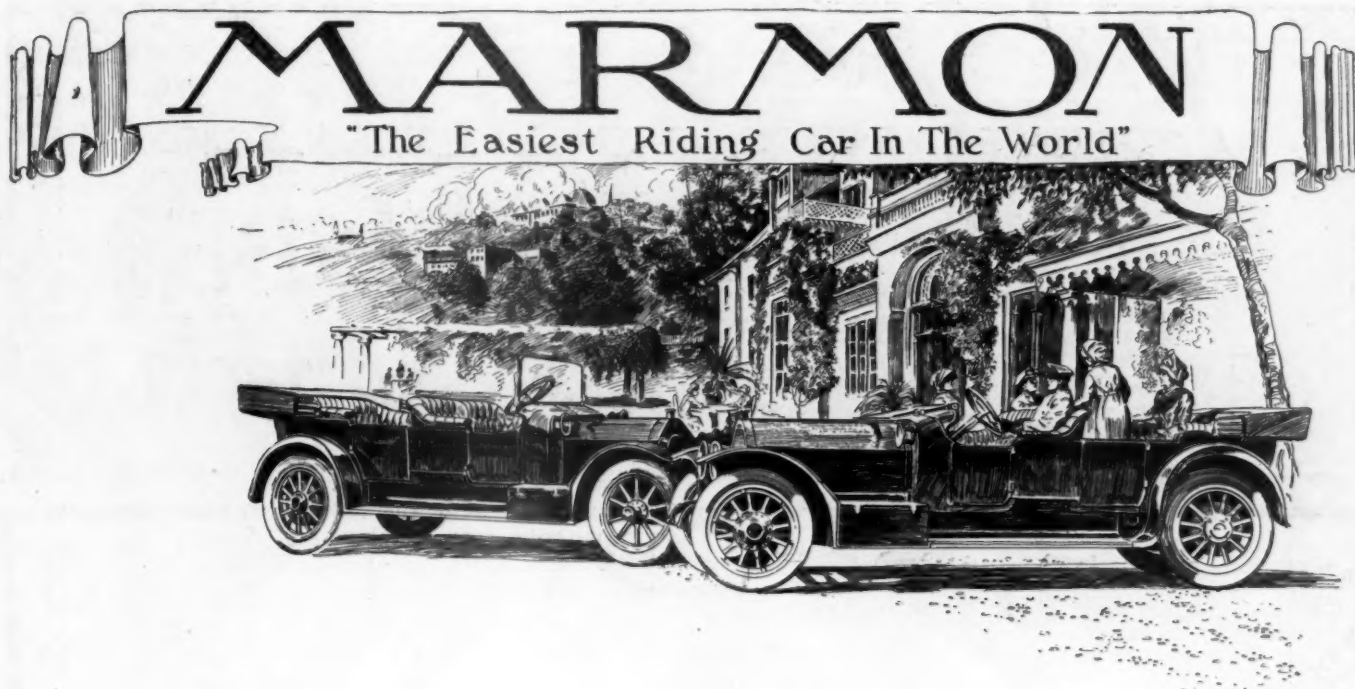
GENIUS

ALWAYS

WINS

The New Departure Mfg. Co.
Bristol, Conn.

Western Branch: 1016-17 Ford Bldg., Detroit



THE Marmon is suited to your every requirement. On the boulevard, beauty of line, completeness of appointment, and prestige classify the Marmon owner as a judge of the best.

On hills, through bad roads or under any touring conditions, sound, dependable construction, perfect balance, ease of operation and economy of tires, fuel and upkeep, prove the wisdom of the Marmon owner under all circumstances.

Consider well before buying the service you require in your car. Then know the Marmon. You will find it best suited to your desire in every way.

Detailed Information on Request

NORDYKE & MARMON CO.

(Established 1851)

INDIANAPOLIS, INDIANA

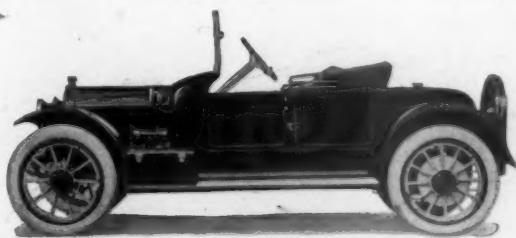
Sixty Years of Successful Manufacturing

The Marmon "32"

Four cylinders, 32-40 h. p., 120-inch wheel-base, electric starting and lighting system, left hand drive, center control, nickel trimmings, with newest body types to meet every requirement and corresponding equipment—\$2,850 to \$4,100.

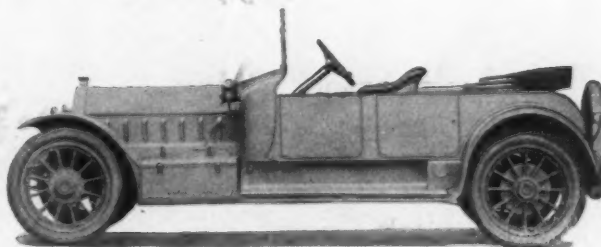
The Marmon "48"

Six cylinders, 48-80 h. p., 145-inch wheel-base, electric starting and lighting system, left hand drive, center control, nickel trimmings, with body types to meet every requirement and corresponding equipment—\$5,000 to \$6,350.



The Marmon "32" Roadster—\$2900

A sensible, logical car for two, combining new and distinctive lines with unequalled convenience and the celebrated Marmon economy of tires, fuel and upkeep. The rear is decked over, providing ample room for suitcases and luggage as well as gasoline and oil tanks. With complete equipment, making an ideal car for city use or touring.



The Marmon "48" Roadster—\$5000

A magnificent car designed for long journeys as well as beauty, comfort and convenience. It offers all the advantages of long wheel base combined with the ease of operation of the short wheel base car. To adapt for three passengers the decked body opens back of the driver's seat, giving an added seat, the top being arranged to cover both seats. Abundant room for luggage and supplies is provided. Get the details of its design and construction and proofs of its dependability today.

When Writing to Advertisers, Please Mention Motor Age.



- LISTEN - to these cold facts

YOU can get every ounce of wear out of your tires, you can wear them down to the last fabric without fear of blowouts if you have GOODMAN TIRE SHIELDS between your casings and inner tubes.

GOODMAN TIRE SHIELDS are chemically and asbestos treated to absorb all the frictional heat so destructive to treads and inner tubes.

The GOODMAN SHIELD is quilted, and so shaped that it forms a complete inner tire which fits snugly around the inner tube, and insures it perfect protection.

Even if your tires are rim cut or slit, they will give you hundreds of miles of additional service if equipped with GOODMAN TIRE SHIELDS.

They do not reduce resiliency as do Stiff Inner Liners.

COST LITTLE: 34"x4" \$7.25 each. Other sizes in proportion.

If there were no jolts to be encountered while motoring, you could stretch the life of your car almost indefinitely.

It is the jolts and shocks improperly directed that make a rattle trap out of a high-class car.

With the CAHILL SHOCK ABSORBER you can protect the working parts of your car from the slightest vibration or the most sudden jolt.

More than this, the CAHILL SHOCK ABSORBER makes any automobile ride as smoothly as a Pullman Palace Car.

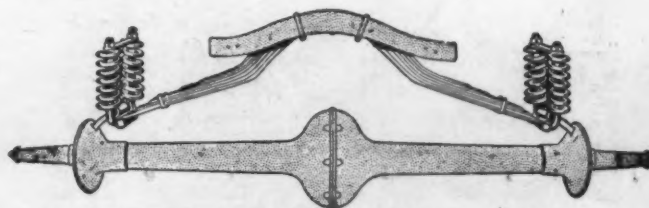
This type of absorber has been adopted by a number of foreign cars.

CAHILL SHOCK ABSORBERS cannot get out of alignment, have no side play, and are entirely trouble-proof. Easily applied with no other tool than a wrench.

Special Model for FORD CARS complete for rear \$10.00. Set. All cars under 2500 lbs., \$10.00; under 3500 lbs., \$12.50. Larger, \$15.00. We will positively refund your money if, after two weeks' trial, you are not satisfied with CAHILL SHOCK ABSORBERS.

FORD AGENTS WRITE FOR OUR SPECIAL PROPOSITION

**Approved Auto
Specialties Co.**
1731-37 Broadway,
New York



THE CAHILL FORD SHOCK ABSORBER

We will Guarantee

 Your yearly tire bill not to exceed \$40 per wheel

It makes no difference whether you drive a touring car for pleasure or operate a fleet of 5 ton trucks for profit—the above guarantee holds good provided you carry as equipment

Frommann Cushion Wheels

You **know** what tires and tire trouble cost you last year. In the aggregate, considerable more than \$40 per wheel, wasn't it? Look up your statistics and you will find that tires and their care made up over half your up-keep expense!

If you could get a set of tires that were from 2 to 12 times more resilient than those you are now using, a set of tires that would not puncture, blow out nor "flat," "chip," "cut" nor "mud-rot," a set of tires the rubber of which was **guaranteed** for from 2 to 3 years, a set of tires whose yearly up-keep was guaranteed not to exceed \$40 per year—you would sit up and take notice, wouldn't you?

The following three pages are devoted to describing in plain, every-day English just such a tire. And the **facts** are pocket-book facts which you as a level-headed business man cannot afford to pass unchallenged.

We will RENT you FROMMANN



We are able to make such an offer and back it up only because the FROMMANN Cushion Wheel differs in principle from every other wheel on the market.

How? The FROMMANN Cushion Wheel is a wheel within a wheel. It is a wheel with a self-contained rail (see cross-section) which makes it as independent of road conditions as a locomotive running on a steel track.

A floating **outer rim** of steel (faced with a tread of hub-elm wooden blocks, or an 11% composition rim on pleasure cars) acts as a buffer for the **inner wheel** (faced with rubber cushions of the highest resiliency). The **outer wheel**, with its wooden block facing, receives all the bumps, cuts, nails and bottle glass on the road and renders them harmless. There is no rubber there to "chip," tear off or puncture—only cheap wooden blocks which can be replaced at 1/50 the cost of rubber.

The **inner** rubber cushion wheel never comes in contact with the rough surface inequalities of the road. It rolls only upon an endless track—a floating rim of steel—which the wheel lays itself. Thus the rubber cushions retain their resiliency without any loss in substance through surface wear. They last longer than rubber tires constantly exposed to wear and weather.

The resiliency of the FROMMANN Wheel is from 2 to 12 times **greater** than that of any pneumatic or solid tire. This makes for the utmost comfort and ease in riding. This extra resiliency is gained by a unique saw-tooth construction of the rubber cushions. Under a loaded vehicle the floating rim of the FROMMANN Wheel rests on not less than 30 rubber teeth or columns. If these columns were outside—if no floating rim were used—the load would be sustained by not over 2 of these columns. The wheel's resiliency would be diminished proportionately.

A load is never **distributed** by an ordinary wheel. When an ordinary wheel hits anything, what happens? Look at the figures at the bottom of the page. The

shock is carried directly to the axle. The car's entire mechanism—its passengers—receive more or less of a jolt. The load is concentrated at one point—it overworks the few square inches of tire in contact with the road—crushes down upon it—leaves 95% of the tire idle.

When a FROMMANN Cushion Wheel hits anything the shock is carried to the rubber cushions "AA" (see cross-section) and by them distributed and absorbed by over 2/5—nearly one-half—the entire area of the wheel.

One small spot on your tire, that in contact with the road, is never working under brutal stress. 2/5 of your wheel is working **all the time**—is doing its share to absorb road inequalities—to lessen the racking wear and tear on your car's mechanism—to distribute the load fairly upon 4 broad, even surfaces rather than upon 4 sharp, jarring points.

In the above features lie the **wonderful resiliency, long life and cold dollars and cents economy** of FROMMANN Cushion Wheels.



CUSHION WHEELS

*for ONE HALF what
your tire bills were last year*

FROMMANN Cushion Wheels eliminate costly tire replacements.

Instead of having to pay for 1, 2 or 3 complete tire changes yearly, the pleasure car owner or truck owner who installs FROMMANN Cushion Wheels has only to replace his wooden tread blocks, trifling in cost, yet, as an outer tread, vastly superior to rubber. These tread blocks roughen with wear, pick up a coating of sand and cinders which "takes hold" on wet and icy pavements with a grip more certain than that of rubber.

Here are figures based on exhaustive investigation and certified by the law of averages. They tell the story of FROMMANN Cushion Wheels better than pages of explanation. Although these figures are for 5 ton trucks, they will apply proportionately to large or small trucks or to pleasure cars.

Where Owner Makes Two Complete Replacements a Year

Ordinary Wheels	
Upkeep 1st yr. (for tire replacements, 2 complete sets).....	\$1380
Upkeep 2d yr. (for tire replacements, 2 complete sets).....	\$1380
Upkeep 3d yr. (for tire replacements, 2 complete sets).....	\$1380
Upkeep for 3 yrs.....	\$4140
Average yearly upkeep.....	\$1380
For 5 yrs.—5 x \$1380.....	\$6900
Original cost of wheels.....	\$700
Total outlay, 5 yrs.....	\$7600
	<hr/> \$7600

FROMMANN Cushion Wheels	
Upkeep 1st yr. (replacing wooden blocks).....	\$100
Upkeep 2d yr. (replacing blocks).....	\$100
Upkeep 3d yr. (replacing blocks).....	\$100
(Replacing cushions).....	\$500
Upkeep for 3 yrs.....	\$800
Average yearly upkeep.....	\$350
For 5 yrs.—5 x \$350.....	\$1750
Original cost of wheels.....	\$1000
Total outlay 5 yrs.....	\$2750
Balance in favor of F-C-W.....	<hr/> \$4850
	<hr/> \$7600

At the end of the second year (third year on light trucks and pleasure cars) FROMMANN Cushions may need replacing. We guarantee them for from

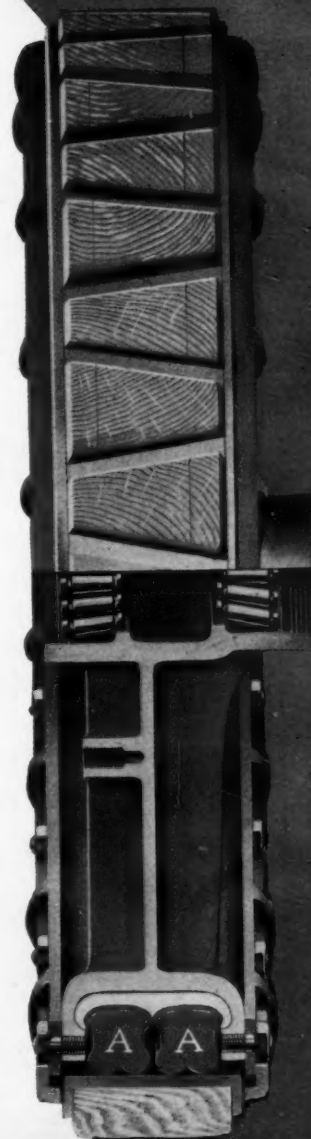
2 to 3 years, but no longer.

Any rubber loses resiliency in time. Hence the need for replacing.



The cost of replacing cushions, however, is exceedingly small compared with replacing complete tires, as the above figures show.

FROMMANN Wheels will pay for themselves in 10 months—exclusive of what they save in power and repairs. They are backed up by 27 basic patents, bear the "O. K." of 33 experts, and are sold under the strongest five-fold guarantee ever written. For full information fill out and send us coupon on last page.



We Guarantee FROMMANN WHEELS to outlast any car they are put on

WE GUARANTEE the metal construction of FROMMANN Cushion Wheels to outlast any vehicle those wheels are put on.

WE GUARANTEE the rubber cushions used in the construction of FROMMANN Cushion Wheels for 3 years on all pleasure cars, and all trucks under 4 tons in weight.

WE GUARANTEE these rubber cushions for 2 years on all trucks over 4 tons in weight.

WE GUARANTEE for the first 2 to 3 years (depending on weight of vehicle) the maintenance of FROMMANN Cushion Wheels not to exceed \$40 per wheel or \$160 per set—practically the only cost being for replacement of wooden blocks during that period. That cost cannot exceed \$5 per rim.

WE GUARANTEE FROMMANN Cushion Wheels to be from 2 to 12 times more resilient than the tires you are now using.

MANUFACTURERS! MOTORISTS! Can you find a tire maker who will duplicate the above guarantees—who is so strongly convinced of the merits of his tires that he will offer to rent them to you for $\frac{1}{2}$ what tire up-keep cost you last year? Emphatically, No!

We Are Booking Orders Now For November 15th Delivery

Begin NOW to share the benefits and profit by the advantages of FROMMANN Cushion Wheels. Place your order at once. We guarantee delivery November 15th on orders booked within 30 days, and until selling arrangements are completed in your territory you can buy direct from the factory.

We cannot guarantee delivery on orders delayed beyond 30 days,

as we expect our sales force to keep us oversold after that time.

In ordering state present wheel specifications. Any mechanic or garage-man can put on the wheels.

THESE BOOKLETS ARE FREE: "Turning Upkeep Into Income," and "One Fact For Truck Manufacturers." Use the attached coupon. Underline the booklet you want.

Wheel Of Fortune Corporation
910 Michigan Avenue
Chicago, Ill.

WHEEL OF FORTUNE CORPORATION
Gentlemen: Kindly send "Turning Upkeep Into Income" or "One Fact for Truck Manufacturers" to

Name.....

Street.....

Town.....

State.....

Prest-O-Starter

The Simplest, Most Reliable and the Most Durable Starting Device

Low priced, quickly installed, and fully guaranteed

FOR FOUR CYLINDERS \$20

\$1.50 extra for two-way valve when one tank is used for both starting and lighting.

FOR SIX CYLINDERS \$25

The Prest-O-Starter is light, economical, and as durable as the engine itself. It is complete. And it is perfectly simple.

A measure of acetylene gas is pumped from the Prest-O-Lite Tank into the cylinders. Touch your spark—and the engine starts.

Unlike "gasoline priming," it is not affected by conditions of heat or cold.

In cool weather, by opening a valve on the dash, acetylene gas at low pressure is fed into the intake pipe. The engine may be thus run on acetylene until it is thoroughly warmed up.

If Prest-O-Starter did no more than prime the engine in this way in cold weather, it would be well worth its price.

But it is more than a mere primer. When properly installed, it will start the engine without cranking, summer or winter, almost invariably.

Make Sure Your Starter Is Correctly Installed. Look It Over

The Prest-O-Starter is easy to install correctly.

In fact, it's so EASY that some good factories and garages install it with utter carelessness—and then blame the starter if it doesn't work.

Fortunately this is an easy matter for the owner of the car to correct, even if he isn't a mechanic.

Our literature makes this perfectly plain—anyone can do it or show a dealer quickly where the trouble lies.

If you have had any such trouble, report it to us. We'll wipe out the trouble quickly.

Insist on Getting the Outfit COMPLETE

The connection which feeds acetylene gas into the intake pipe is not needed in warm weather. So some dealers are not installing it. In cold weather this connection is almost indispensable. You're entitled to it! Insist on it!

Thoroughly Satisfactory But Not Infallible

Rest assured that no other starting device will give you as high a percentage of starts, with as great economy, durability, and freedom from mechanical troubles.

But if you expect any starter to work **ALL THE TIME and EVERY TIME**, you are going to be disappointed.

With any spark starter, if your engine stops on "dead center" or stops with a burnt charge of gas in the cylinder, an eighth or a quarter turn of the crank is necessary.

These instances are very rare, and even then the cranking is slight and may be done with the battery switch at neutral to insure perfect safety.

Correctly installed and given reasonable care, Prest-O-Starter will give you 9 starts out of 10 attempts or better.

The convenience, the safety, and the intense satisfaction insured by Prest-O-Starter should appeal to every motor car owner.

The low price puts it within easy reach.

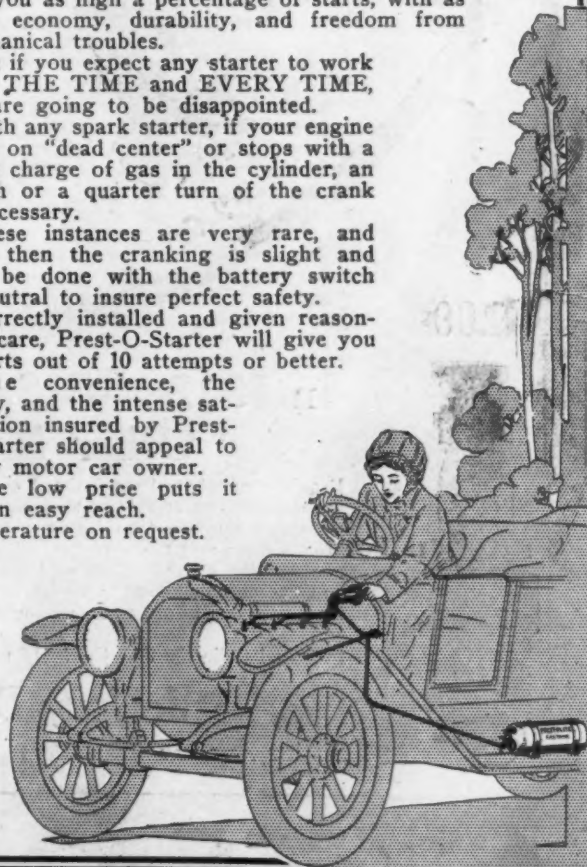
Literature on request.

The Prest-O-Lite Co. 233 E. South St. Indianapolis, Ind.

Canadian General Office and Factory, Merriton, Ont.

BRANCHES: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Indianapolis, Jacksonville, Kansas City, Los Angeles, Memphis, Tenn.; Milwaukee, Minneapolis, New Orleans, New York, Omaha, Philadelphia, Pittsburgh, Portland, Ore.; Providence, St. Louis, St. Paul, Minn.; San Antonio, San Francisco, Seattle, Syracuse, Merriton, Ont.; Winnipeg, Manitoba.

Exchange Agencies Everywhere



When Writing to Advertisers, Please Mention Motor Age.

**JEFFERY-DEWITT CO.
DETROIT, MICH.**

SPARK PLUGS

**JEFFERY-DEWITT CO.
DETROIT, MICH.**

SPARK PLUGS

Every J-D Plug passes through 3 distinct departments and goes through 52 operations. Only the highest class of skilled labor and the costliest of materials are employed. The result—as you would expect—is a series of spark plugs higher in efficiency by every test—heat, electrical and breakage. Such plugs are bound to be best sellers.

\$1.00

\$1.25

75¢

75¢

75¢

75¢

\$1.00

\$1.25

\$1.25

\$1.25

\$2.00

\$1.50

\$1.00

\$1.25

In 1912 J-D Spark Plugs Outsold All Other High Grade Plugs

People everywhere have insisted on having these plugs that combine the finest handiwork and the costliest materials—at the price of ordinary plugs. The J-D Visible Gap Spark Plug "that locates ignition troubles at a glance," without testing and without removing the plug from the motor; and the J-D Conical or Petticoat Plug with closed end and platinum points—supreme in oily motors—have sold and re-sold in enormous quantities. Beyond a question they are the most popular plugs ever introduced.

No dealer can afford to be without these plugs. In 1913 their sales will reach into the millions.

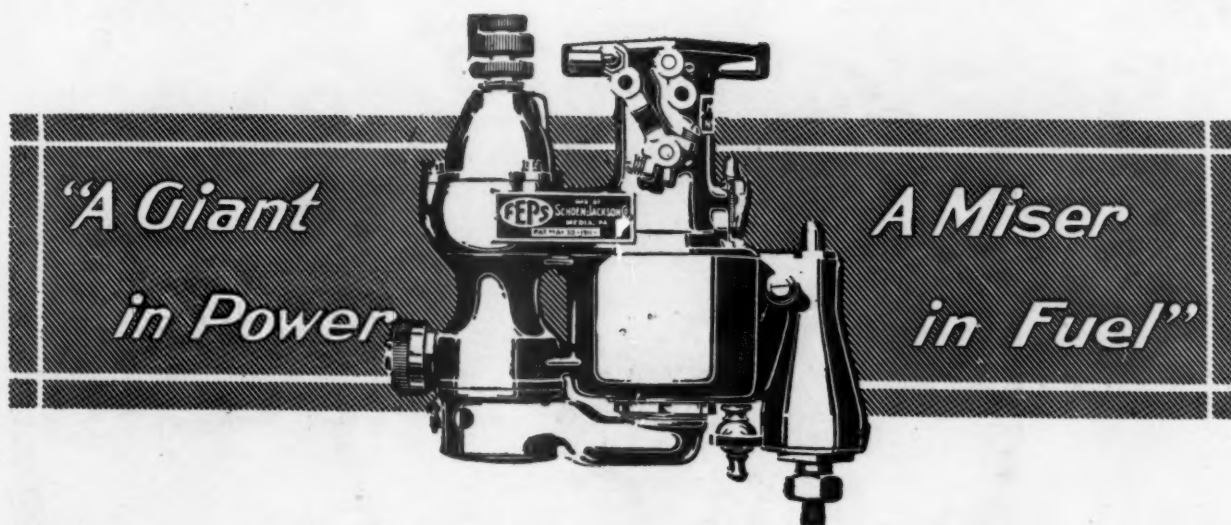
Do you handle the J-D line? If not, write at once for all particulars.

Jeffery-Dewitt Company

51 Butler Avenue

DETROIT, U. S. A.

Insure Against Worry —Equip Your Car with the



FEPS CARBURETOR

CAN there be any question in the minds of motorists today that a considerable majority of motor troubles are traceable to imperfect carburetion? The carburetor has always been a source of dissatisfaction. Practically every other undesirable feature of motor-ing has been overcome. Every other inefficient part perfected—but carburetors are today the big worry, and almost the only one, to the automobile owner.

At last there is "one way out," equip your car with the Feps Carburetor; experience the peace of mind that comes only with the knowledge of absolute cer-

tainity, learn for the first time the top notch efficiency of your car.

Why? Because the Feps will increase the power and speed of your motor in an astonishing degree, making it so intensely flexible that the slightest movement of the throttle finds immediate response. It will give a perfect gas mixture at all speeds with any grade of gasoline, and with all this, it will give you 25% to 50% increase in mileage per *gallon* of fuel. It also embodies a never-failing quick starting device. Yes; we know it sounds impossible; that's why we let you prove all these statements on *your car at our risk*.

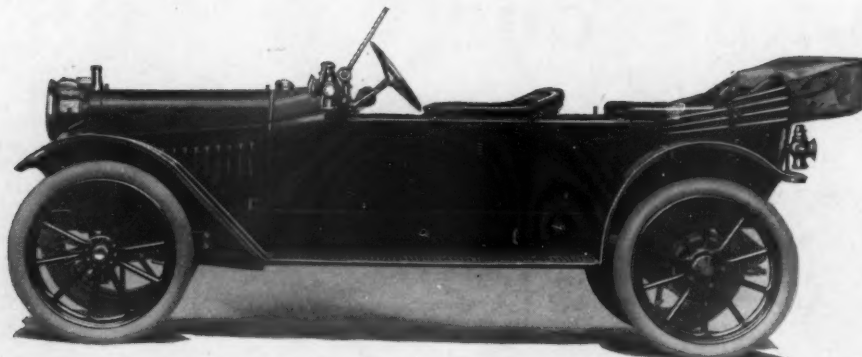
Write Dept. "G" for Descriptive, Illustrated Booklet



Schoen-Jackson Co.
Media, Pa.



Hupmobile



Simplicity and Sturdiness meet in this Car

The Hupmobile is as much at home in the lumber camps as on the boulevards. As one enthusiast puts it, "It will run anywhere that a dog can go."

Quality in looks and construction without high cost is the problem our engineers have conquered.

Look at the clean body lines, free from outside trappings, which not only make for beauty, but for easier care of the car.

The chassis, too, as you see, is stripped of every intricacy; every working part is enclosed; dust proof and oil tight.

There are but four rods from front to rear; and a rear axle so sturdy that truss rods are not needed.

From time to time we have told you of the Hupmobile's structural and operative details.

Here they are assembled—the sound basis of our belief that the Hupmobile is, in its class, the best car in the world.

You should have our new catalog, which details many of the worthwhile advantages of Hupmobile practice. Write for it.

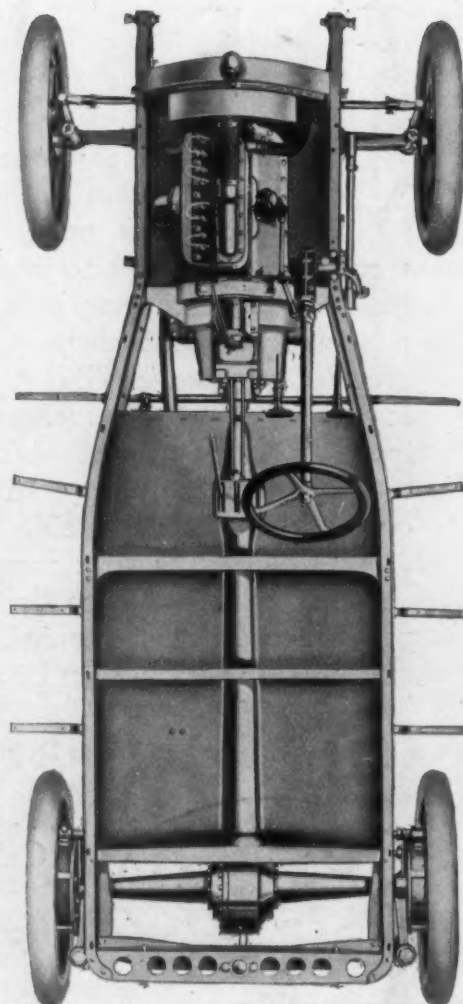
HUPP MOTOR CAR CO., 1228 Milwaukee Ave., Detroit, Mich.

Hupmobile "32" Touring Car (illustrated), fully equipped, \$1000

F. O. B. Detroit, including equipment of windshield, mohair top with envelope, Jiffy curtains, speedometer, quick detachable rims, rear shock absorber, gas headlights, Prest-O-Lite tank, oil lamps, tools

and horn. Three speeds forward and reverse, sliding gears. Four cylinder motor, 3¼-inch bore and 5½-inch stroke; wheelbase, 106 ins.; 32x3½-in. tires. Standard color, black. Trimmings, black and nickel.

"32" Six-passenger Touring Car, fully equipped.....	\$1200 f. o. b. Detroit
"32" Roadster, fully equipped.....	\$1000 f. o. b. Detroit
"32" Delivery, fully equipped.....	\$1100 f. o. b. Detroit
"20" H. P. Runabout, fully equipped.....	\$750 f. o. b. Detroit



When Writing to Advertisers, Please Mention Motor Age.

LEE TIRES

Every man
who owns a car,
every man who sells
tires, should be interested in

the only complete tire line

Note that "only," please—then verify the statement by the facts.

Find, if you can, any other tire line that offers you one tire (like the **Lee Regular**) that meets every demand for better service. Every Lee Tire is made by the correct, wrapped-tread, single-cure process that most factories can use on only a fraction of their product.

—another tire (like the **Lee Puncture-Proof Pneumatic**) that brings and holds the trade of the man who is determined to avoid punctures, delays and expense. Has averaged 6026 miles per tire on 140 tires for one user. Write for our "puncture-proof or money back" guarantee.

—either regular or puncture-proof tire in a perfected non-skid pattern (like the **Lee Zig-Zag**) that is really effective, and

—a first quality tire (like the **Leeland**), sold factory-perfect, that eliminates mileage adjustments entirely, effecting a material saving for the careful autoist who does not abuse his tires.

Write for full details and our Dealers' Co-operative Proposition "U" to us or our distributors

835 Seventh Ave., New York City; 1241 Michigan Ave., Chicago; 334 N. Broad St., Philadelphia; Grand & Lindell Bldgs., St. Louis; 10 Park Square, Boston; 1922 E. 18th St., Cleveland; 201 Wood St., Pittsburgh; 801 Main St., Cincinnati; 605 E St., N. W., Washington, D. C.; 622 Third Ave., South, Minneapolis; Gay & Fourth Sts., Columbus, O.; 609 Cove St., Norfolk, Va.; 715 Commerce St., Fort Worth, Texas.
For Pacific Coast: Chanslor & Lyon Co., San Francisco, Los Angeles, Seattle, Spokane, Fresno and Portland, Oregon.

KELLY-FIELD CO.

1737 Broadway New York City

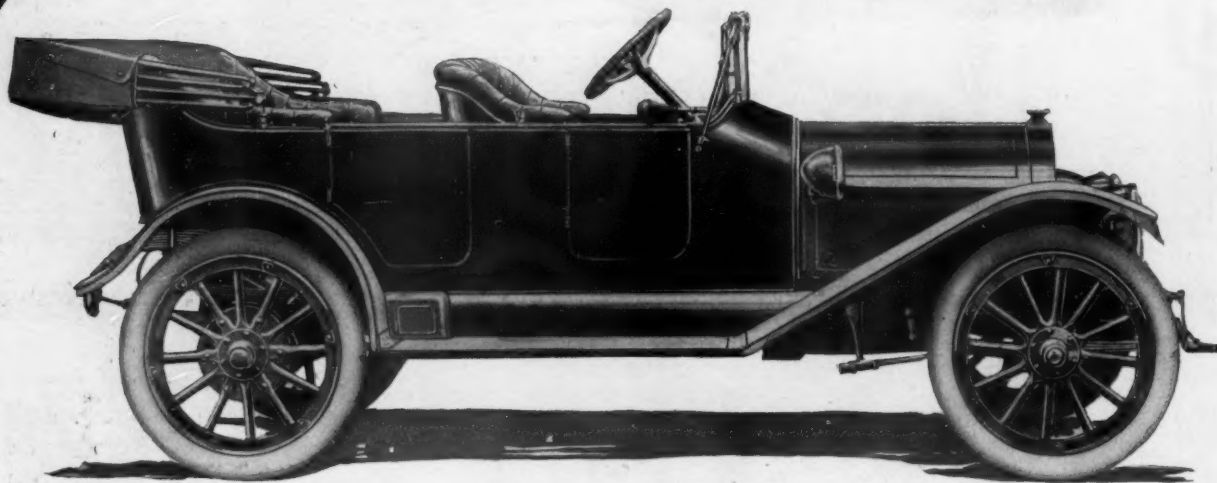
General Sales Agents for Lee Tires
and Tire Accessories

LEE TIRE & RUBBER CO.

J. Ellwood Lee, President

CONSHOHOCKEN, PA.

Cutting
CARS



The Cutting A Car of Extraordinary Value

You don't need to be an expert judge of motor car values to recognize the superior value the Cutting offers.

When you see the car you will at once recognize tangible evidence of its extraordinary value.

You will encounter, all over the Cutting, the evidence of experience, ingenuity and of purpose.

You will see them expressed in the features that make for increased comfort; increased convenience and economy of operation; increased safety for the passengers and longer life for the car.

These specifications tell only one-half the story:—

Long stroke motor—enclosed valves—self-starter—120-inch wheelbase—larger wheels and tires—deep, rich, luxurious upholstery.

The real Cutting supremacy lies in the organization back of the car—the organization that builds character and quality into every detail of engineering and construction.

To the Dealer

Dealers who want the biggest sales value in the motor car field should look up the Cutting.

You will be impressed with the unmistakable evidences of value—the things that attract the buyer to the car; that make the Cutting an easy and ready seller.

If you are interested and feel capable of selling Cutting cars do not hesitate but get in touch with us at once.

We can offer you good territory that will assure lasting and profitable business. Write or wire for complete information.

1913 — Models — 1913

B-40-Five-passenger touring car \$1475

A-40-Two-passenger roadster.. \$1475

The same chassis is used for both models—the bodies being interchangeable. Electric starter and lighting system will be installed on either model at a slight additional cost.

ALL MODELS FULLY EQUIPPED

Cutting Motor Car Company 300 Mechanic Street
JACKSON, MICH.

Canadian Distributors—Cutting Motor Sales Co., Toronto, Canada

When Writing to Advertisers, Please Mention Motor Age.

The Atwater Kent Ignition System

THE Flexibility and Power obtainable from a motor equipped with the Atwater Kent Ignition System, especially our latest development, Model "K" with automatic spark control, is one of the most important developments in the motor industry.

Think what it means in smooth, sweet running that even the biggest and heaviest four and six-cylinder cars equipped with the Atwater Kent Ignition System may be throttled down on high gear through crowded streets as slowly as three miles per hour and accelerated on good stretches of road to the maximum speed of which the motor is capable without once touching the spark lever.

The automatic spark control of the Type "K" Atwater Kent System is more than human in its performance—it is sensitive to the slightest variation in speed—immediate in its response and positive in its action.

No single detail looking toward durability and simplicity has been neglected in this new type, which contains but three moving parts, virtually non-wearable, one contact and a single adjustment needed but once every 10,000 miles.

Picture the pleasure of automatic spark control on your present or future car and you will find your desires realized in the new Type "K" Atwater Kent Ignition System.

Our booklet explains the Atwater Kent System and the value of automatic spark control. Write for a copy.

ATWATER KENT MFG. WORKS

4934 Stenton Avenue
Philadelphia, Pa.

DISTRIBUTORS—New York, E. J. Edmond Co.; Chicago, Motor Car Supply Co., Pellets Magneto Exchange; San Francisco, Chanslor & Lyon Co., Weinstock-Nichols Co.; Los Angeles, E. A. Featherstone; Seattle, Chanslor & Lyon Co.; Portland, Ballou & Wright; Omaha, Omaha Rubber Co., Powell Auto Supply Co.; Dallas and Houston, Fisk Co. of Texas; Wichita, Hockaday Auto Supply Co.; St. Louis, Missouri Auto Specialty Co.; Salina, Lee Hardware Co.; Kansas City, Kansas City Auto Supply Co.; Milwaukee, Julius Andrae & Sons Co.; Detroit, Automobile Equipment Co.; Boston, Motor Supply Shop; Denver, Auto Equipment Co.; Hartford, Post & Lester Co.; Atlanta, Elyea-Austell Co.; Chattanooga, Southern Auto & Supply Co.



14,299 Men

Wrote for Facts About This "40"

The advertising of the Michigan "40" has so far brought us inquiries from 14,299 men.

It has brought hundreds of dealers here to inspect it—dealers who have bought.

It has brought to us experts from eleven foreign countries. And this car will be running, before the season is over, on half the roads of the world.

Why they Came

They came because this car is built by W. H. Cameron, who has built 100,000 very successful cars.

They came because John A. Campbell designed for this his most artistic body.

They came because every detail, every specification, shows the utmost in modern practice. And because no other car in the whole Forty class begins to give so much for the money.

MICHIGAN MOTOR CAR COMPANY, Kalamazoo, Michigan

Owned by the Owners of the Michigan Buggy Company

Make Comparisons

What other car under \$1,950 has four - forward - speed transmission? What other car in this class has such tires, such brakes and springs, such margin of safety?

What car at any price has 14-inch cushions, a 22-coated body, such impressive design, such width of seat?

What car has a better engineer behind it, a better body designer, or a factory with better facilities?

And what car is advertised more efficiently than the Michigan "40" this year?

We are not lacking orders, but we seek this year the widest distribution. In every section we want a few cars to build up Michigan prestige.

If you are seeking the utmost in Forties let us hear from you.

Michigan "40" \$1,585

With All These Special Features

Four-forward-speed transmission, as used today in all the best foreign cars.

Oversize tires—35 x 4½ inches—making the Michigan practically the only excess-tired car in America.

Electric lights—with dynamo.

Center control.

Left side drive, to which all the best cars are coming.

40 to 46 horsepower.

Cylinders—4½ x 5½ inches.

Brakes—extra efficient—drums 16 x 2½ inches.

Springs—2½ inches wide—front, 37 inches long; rear, 50 inches long.

Steering post adjustable. So are clutch and brake pedals, insuring perfect comfort and fit to every driver.

Shortsville wheels, with 1½-inch spokes—12 to each wheel.

Demountable rims—Firestone quick-detachable, with extra rim.

Wheel base—118 inches.

Straight-line body, designed by John A. Campbell. Finished with 22 coats.

14-inch Turkish cushions—The deepest cushions, we believe, and the most comfortable in use on any car.

Rear seat 50 inches wide inside—22 inches deep. Doors 20 inches wide. Tonneau room 50 inches either way.

Nickel mountings.

Headlights—electric—12½ inches diameter, very powerful.

Sidelights—set in dash—flush with it.

Windshield built as part of body, easily inclined to any angle.

Mohair top, side curtains and envelope complete.

Electric horn.

\$50.00 Jones Speedometer.

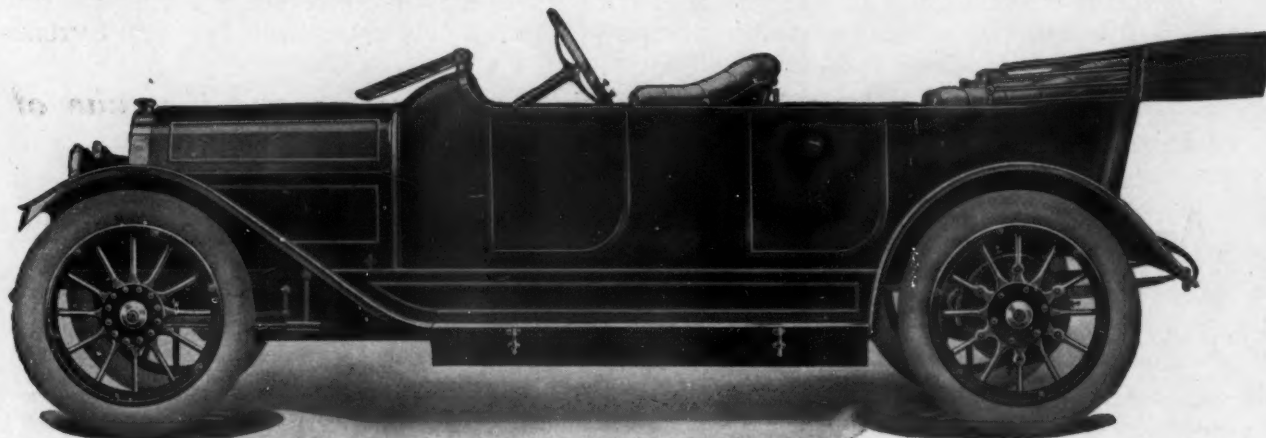
Foot rail, robe rail, rear tire irons, tool chests, with all tools, under running boards.

Over-capacity. Every driving part made sufficient for a 60-horsepower motor.

Self-Starter

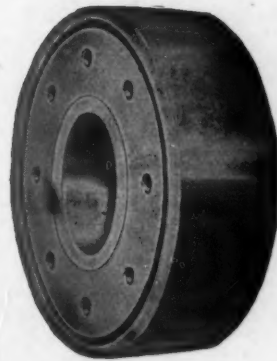
There is such a difference of opinion about the relative merits of the various types of self-starters that we have not adopted any one type as regular equipment. We prefer to leave this selection to the buyer.

However, we equip with either the gas starter or a positively efficient electric starter, at a very moderate extra price. (167)





Hyatt Quiet Bearings



THE Hyatt Flexible Bearing presents practical as well as theoretical advantages, from every viewpoint. It is the result of combining a correct theory and modern specialized manufacturing.

A bearing of quality—quiet, efficient, simple, and durable—is the sole product of the Hyatt Factory. It is flexible, and non-adjustable. Into it are put the best of steels, all carefully tested in the Hyatt laboratories and heat treated to give them maximum possible strength.

To this is added the service which an efficient organization renders car builders and car users through its sales and mechanical departments. Hyatt service constitutes an absolute insurance against bearing difficulties.

“Maximum Practical Value” tells the story in three words.

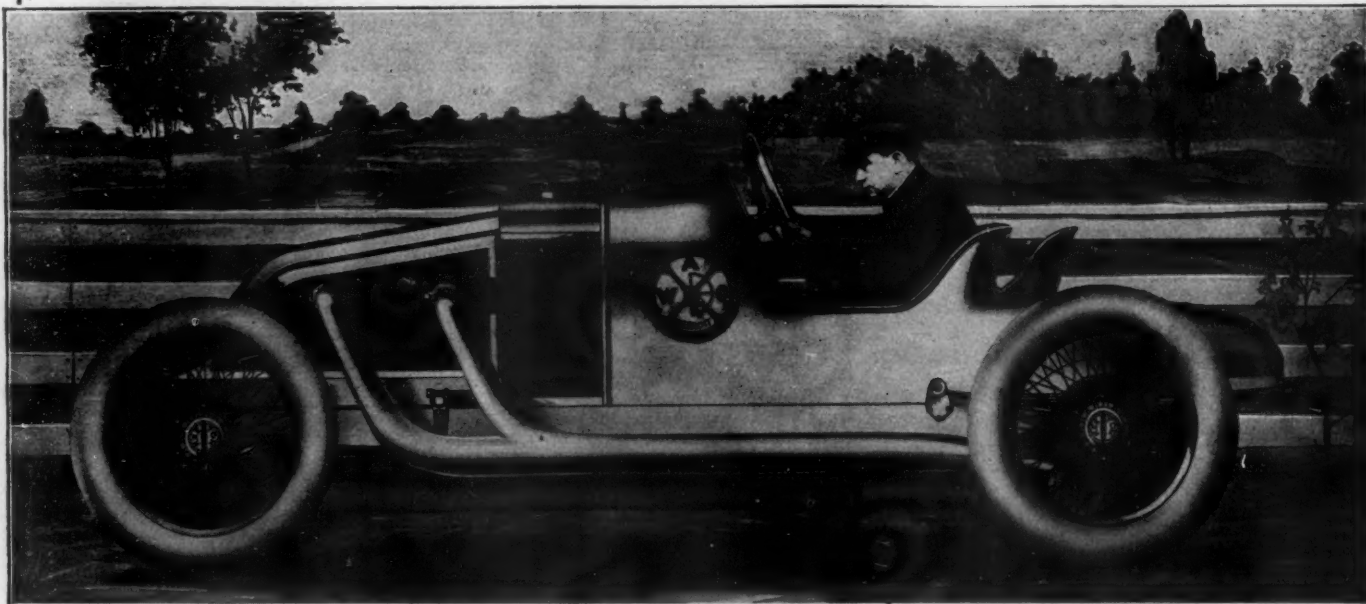
HYATT ROLLER BEARING CO.
DETROIT, MICHIGAN

WORKS, NEWARK, NEW JERSEY

"Why I Rely Upon the Keeton"

The simplicity of design and the mechanical construction with the high grade of workmanship and materials used in the "Six 48" Keeton insure a strength and stability that will enable me to win the 500 mile race at Indianapolis in May.

Bob Burman



BOB BURMAN IN HIS KEETON RACER

"Bob" Burman, the "Speed King of the World," came all the way from San Diego, Cal., to the New York show to find a car to drive and win the 500 mile race at Indianapolis in May.

Burman is determined to win the fortune that goes with first place in the 1913 speedway. He had the best made and most costly cars of Europe and America to choose from. The price of the car was no consideration to him, he wanted mechanical perfection—a car to stand up under the terrific strain of the racking contest. He looked at many cars, and had offers from many manufacturers, but from the vast experience and expert knowledge gained in his victorious career on the race track—found the Keeton to be the only one to meet his exacting requirements.

The mechanical construction and extreme simplicity of the chassis—the powerful small $3\frac{3}{4}$ " bore long $5\frac{1}{2}$ " stroke motor—the dash board radiating system—doing away with the troublesome water pump—fan and fan belt—the four speed transmission—the imported annular bearings used throughout the car—the special alloy steels used—

wire wheels—light weight and numerous other features were immediately recognized as being the best fitted to stand up under the enormous strains imposed on them in a grind of this character. Just think of the margin of safety in ordinary usage.

It is not speed alone that wins a long race but rather a consistent performance that is only obtained by a harmonious action of all the parts; which in turn must be of such design and strength as to be able to endure the wear and tear of a grinding race.

This "Six 48" Keeton passed the supercritical inspection of a man who has driven the fastest, costliest and best made cars of both foreign and domestic make to victory, and who relies upon the Keeton to win one of the biggest and hardest races in the world. Can you do any better than to follow his judgment? Send for complete specifications. This is a six at \$2,750, fully equipped, that compares with the best cars of Europe and America.

Dealers will be interested in our selling proposition. Write or wire today.

Keeton Motor Company

Phone Wal. 1067. Lawton and M. C. R. R.

Detroit, U. S. A.

KEETON MOTORS, LTD.—BRANTFORD, ONT., CANADA

A Business Building Delivery Car

Lippard-Stewart

The Delivery Car

CHASSIS
List - - \$1650
BODIES
Standard Panel - \$150
Standard Express \$125



The Lippard-Stewart Model "P" 1500 lb. Delivery Car

Service Spells Success in Every Business. And this applies to a delivery car as well. For, service is an essential demanded of every vehicle—not merely the ability to just meet requirements, but the ability to give service plus—service in excess. And because the Lippard-Stewart realizes and gives this kind of service, it justly deserves your serious consideration. Owners everywhere—men who use this car—will tell you that it will deliver more goods over a wider territory in less time and at less cost per package than is possible with horse and wagon. Better still, they will tell you how completely it is doing its work, and how in the long run it is inexpensive in upkeep and more economical than horse-drawn equipment.

Practical Reasons for the Success of This Car are many. It is a bona fide delivery wagon—designed by transportation experts and built specifically for commercial purposes. Throughout the entire construction of the car no attempt has been made to compromise with pleasure car practice. No pleasure car parts are used. Its chassis is strictly a commercial car chassis with its frame built wider and heavier at the point of greatest stress and reinforced with corner gusset plates. The motor is a thirty horsepower Continental—efficient and amply powerful to meet any demand made upon it.

Every Detail of the Car's Construction Tends Toward Service—maximum service. The transmission is a real truck transmission—strong enough for a 50-Horsepower car. The rugged cone clutch guarantees strength and simplicity combined. The differential and back axle are of the famous Timken make. Perfect spring suspension is another feature that makes for easy riding, roadability and longevity to the car itself. Furthermore the car is simple in construction and easy to drive. The spark is set. In this way careless spark adjustment is eliminated. A single lever in the steering wheel is the only motor control. As for accessibility, every vital portion of the mechanism is readily get-at-able even when the car is loaded.

Simplicity, Serviceability and Dependability have been the key notes of construction throughout its entire man-

Lippard-Stewart Motor Car Co.
Buffalo, New York

Manufacturers of 1500 lb. Delivery Cars of Every Description
AUGUST BECKER, President. E. J. BARCALO, Treasurer.
J. C. MILLAR, Secretary. C. S. DAHLQUIST, Chief Engr.
W. F. REYNOLDS, Sales Manager.

ufacture, and these qualities have been accomplished by the use of the best materials, the most modern methods of manufacture and, greatest of all, the skill—the experience—the competence of the men who have built the car. Beyond all this, however, the price of the car is consistent, and the Lippard-Stewart Delivery Car stands out today as a striking example of honest, intrinsic, unquestioned value. Analysis of the car—comparison with other cars apparently competing with it—will prove this fact conclusively. As a prospective owner this is a vital factor to consider. As a dealer the car's value as an investment—its ready salability and the quick turnover of capital it makes possible, are indeed attractive.

Note the Comprehensive Lippard-Stewart Line the volume of sales it makes possible—a line that offers a car to meet the specific demands of practically every firm or individual who needs a delivery car regardless of their business. Look over these many models. Note their pleasing prices: Panel Body, Model P, \$1800—Express body with top, Model E, \$1775—Box body, \$1775—Stake Body, \$1775—Police Patrol, \$2325—Ambulance, \$2325—Omnibus, \$2325—Undertaker's Casket Wagon, \$2300 and the Undertaker's Hearse-Casket Wagon De Luxe at \$3600.

Read These Special Features of Lippard-Stewart Construction. Continental 30 H. P. Motor, Eiseman Magneto, Brown-Lipe Selective Transmission, Cone Clutch, Full Floating Timken Rear Axle, Timken Roller Bearings throughout, Special Spring Suspension, Left-hand Drive, Pneumatic Tires 35 x 4½ Front and Rear—full equipment of Lamps and Tools.

We Want Good Dealers Everywhere. We have the opportunity of a lifetime to offer first-class men—men who can measure up to our standards of integrity and business ability. Territory is being allotted fast, but—if we have no dealer in your town and you are the logical man to represent us, write or wire us today. We will mail you our confidential dealer's proposition immediately.

LIPPARD-STEWART MOTOR CAR CO. (M.A.)
Buffalo, N. Y.
Please send catalogue and dealer's proposition immediately.
Name
Street
City..... State.....

AJAX

MILEAGE CONTEST

The Ajax-Grieb Rubber Company, as an incentive to the proper care of Ajax Tires (guaranteed in writing for 5,000 miles) and to publicly demonstrate their wonderful mileage

OFFERS

\$5,000 in Cash Prizes

To the **LICENSED CHAUFFEURS** obtaining the greatest mileage on any Ajax Tire from **APRIL 1, 1913, TO MARCH 31, 1914.**

Prizes to be Distributed as Follows:

STANDING OF CONTESTANTS ACCORDING TO MILEAGE	1	1 prize.....	\$ 500.00
	2	1 prize.....	300.00
	3	1 prize.....	200.00
	4- 8 (inclusive)	5 prizes of \$100.00 each.....	500.00
	9- 18	10 " " 50.00 "	500.00
	19- 58	40 " " 25.00 "	1000.00
	59-108	50 " " 20.00 "	1000.00
	109-208	100 " " 10.00 "	1000.00
		208 Prizes	\$5000.00

The Contest is open to licensed chauffeurs but not to owners or chauffeurs driving their own cars. Entrants are to make application at once to Ajax-Grieb Rubber Co., New York, nearest *Ajax Branch* or *Ajax Dealer*, for blank on which formal entry must be made to Contest Department, Ajax-Grieb Rubber Co., 1796 Broadway, New York. On this blank must be recorded Size of Tire, Serial Number, Where and of Whom Purchased, Date of Purchase, When Put in Service, Speedometer Reading at Start—all to be countersigned by the employer of the chauffeur. When official entry has been made a report card will be furnished by which the entrant will supply the Contest Department, Ajax-Grieb Rubber Co., 1796 Broadway, New York, the date each tire is out of use, the speedometer reading, etc. this report to be countersigned by the employer.

What the Ajax Mileage Contest Means to Owners

Owners will recognize at once the merits of the Ajax Mileage Contest. It will mean a direct interest on the part of the chauffeur in the Mileage obtained from the Ajax Tires on his car—the same care and consideration of these tires as the good chauffeur

gives to the entire mechanism of his machine. The use of Ajax Tires (guaranteed in writing for 5000 miles) under any conditions is a Great Economy. With better care and increased interest on the part of the chauffeur *this economy will be even greater*

Committee of Awards

A committee of men well known in different walks of life has consented to judge the final awards. This committee consists of Alfred Reeves, Vice President and General Manager, Hartford Suspension Co., Jersey City; R. A. Patteson, Vice President, Tarrytown National Bank, Tarrytown, N. Y.; L. W. Scudder, Certified Public Accountant, Investors Agency, 55 Wall Street. **In case of a tie lots shall be drawn by this committee.**

CHAUFFEURS—It Costs Nothing to Enter the Ajax Mileage Contest. The only Requirements are that your car be equipped with Ajax Tires (guaranteed for 5000 miles) and that you fill out the regulation entry blank, signed by your employer. Entry may be made to *any Ajax Branch or Dealer* before March 31, 1914. **THE SOONER YOU ENTER THE LONGER TIME YOU WILL HAVE TO WIN A PRIZE.**

AJAX-GRIEB RUBBER COMPANY

Contest Department C

Brooklyn—1182 Bedford Avenue
Boston—15 Park Square
Philadelphia—316 No. Broad Street
Atlanta—48 Auburn Avenue
Dallas—1513 Jackson Street

AJAX BRANCHES

Detroit—507 Woodward Avenue
Chicago—18th St. and Michigan Ave.
Cleveland—18th and Euclid Avenue
Kansas City—1606 Grand Avenue
Minneapolis—905 First Ave., South

1796 Broadway, New York

Denver, Colo.—1518 Broadway
San Francisco—Golden Gate & Van Ness Aves.
Los Angeles—1229 So. Olive Street
Portland, Ore.—329 Ankeny Street
Seattle—917 East Pike Street

DEALERS IN PRINCIPAL CITIES

R-C-H**"Twenty-Five"****Completely
Equipped****\$900****F. O. B. Detroit****THE CAR**

Wheelbase—110 inches.
 Motor—Long-stroke, four cylinders cast en bloc; $3\frac{1}{4}$ in. bore, 5 inch stroke. Two-bearing crankshaft. Timing gears and valves enclosed. Three-point suspension.

Steering—Left Side. Irreversible worm gear, 18 in. steering wheel. Throttle control on steering column.

Control—Center Lever operated through H-plate integral with universal joint housing just below. Hand lever emergency brake at driver's right. Foot accelerator in connection with hand throttle.

Springs—Front, semi-elliptic; rear, full elliptic and mounted on swivel seats.

Frame—Pressed steel channel.

Axles—Front, I-beam, drop forged; rear, semi-floating type.

Transmission—Three speeds forward and reverse; sliding gear; selective type.

Construction—Drop-forgings wherever practicable; chrome nickel steel used throughout all shafts and gears in the transmission and rear axle; high carbon manganese steel in all parts requiring special stiffness.

Bodies—Touring car, full five-passenger English type; extra wide seats. Roadster, two passenger, English type.

THE EQUIPMENT

Tires— $32 \times 3\frac{1}{2}$.

Large gas headlight with Prest-O-Lite tank or generators; oil side and tail lamps. Electric lighting outfit by special arrangement.

High-grade magneto.

Stewart speedometer.

Demountable rims.

Extra rim and holder.

Tally-ho horn.

Jiffy curtains—up or down instantaneously.

Top and top cover.

Windshield.

Tool kit, Jack, Tire repair kit,

Pump.

Roof rail.

A CAR which makes good in its first season cannot help but be a bigger success in the second. So it is with the R-C-H "Twenty-Five." We delivered 7,000 R-C-H "Twenty-Fives" last year; this year our output far exceeds that of last.

And the efficiency of each individual R-C-H "Twenty-five" is increased this year in like ratio. The car is perfectly developed—fit for the hardest kind of service anywhere. Every single mechanical part of the chassis has been proven and tested. It is a stronger, better R-C-H "Twenty-five" than ever.

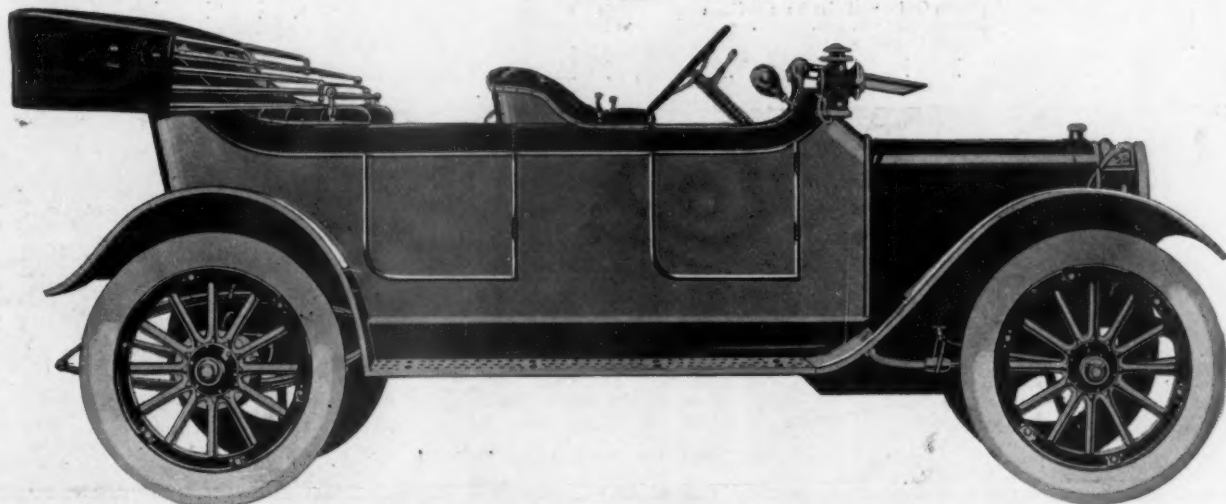
The confidence of the public in the R-C-H "Twenty-Five," the R-C-H factories and the men behind both, is marked by increased orders and contracts from every section of the world. We have contracts at this date calling for \$12,000,000 worth of 1913 R-C-H "Twenty-Fives"; the distributor for Great Britain asks for one thousand cars, and there is not one automobile-using country under the sun in which R-C-H is not selling today. Representatives in no less than forty-two foreign countries have orders on file.

In short, the strength, stability and thoroughness of the R-C-H Corporation and its production system is typified in the quality of the 1913 R-C-H "Twenty-Five."

We cannot promise to take care of you in the Spring rush—unless we get your specifications now. Write us today.

R-C-H Corporation**101 Lycaste Street,****Detroit, Michigan**

Represented by Branches and Distributors in all Cities of the World.



When Writing to Advertisers, Please Mention Motor Age.

No manufacturer can build a poor-oil proof car

Poor oil is abusing more good cars today than any other form of misuse.

That's why the leading motor manufacturers are vigorously advising the use of **Wolf's Head Oil**.

Here are some of the famous manufacturers who already use or advise the use of Wolf's Head Oil:

Lozier
Willys-Overland
Hudson
Oldsmobile
Hupmobile
Marion
Columbia
Stoddard-Dayton
Maxwell
Paige-Detroit
Isotta
Mercedes
Itala
Matheson
Silent Knight Daimler
Clement-Bayard
Warren



Brush
Van Blerck Motor Co.
Electric Launch Co. (Elco)
Gray Motor Company
Reliance Motor Boat Co.
Fifield Bros.
Blount and Lovell
Crane Brothers
Makers of Dixie IV Engine
Detroit Engine Co.
Columbia Engine Co.
Atlantic Boat Co.
Midland Motor Co.
Federal Motor Truck Co.
Gas Engine & Power Co. and
Chas. L. Seabury & Co., Cons.
Loew Victor

Wolf's Head Oil is manufactured by the
WOLVERINE LUBRICANTS CO., MAIN OFFICE, 78 BROAD STREET, NEW YORK
Plants: New York City and Franklin, Penna.
Branches: CHICAGO, PHILADELPHIA, WASHINGTON, BOSTON, JACKSONVILLE, UTICA, PITTSBURGH

Territorial Agents:

W. P. FULLER & CO.	San Francisco	THE OZBURN AUTO SUPPLY CO.	Memphis, Tenn.
BUHL SONS CO.	Pacific Coast, Australia, and New Zealand	BARTLES OIL CO.	St. Paul, Minn.
CANADIAN FAIRBANKS-MORSE CO., Ltd.	Detroit, Mich.	BARTLES-MAGUIRE OIL CO.	Milwaukee, Wis.
THE EQUIPMENT CO.	Michigan, Northern Ohio, and Northern Indiana	BARTLES-NORTHERN OIL CO.	Grand Forks, N. D.
EVANS OIL WORKS	All Canada	ELMER E. HARRIS	Buffalo, N. Y.
	Kansas City, Mo.	ARTHUR STORZ AUTO SUPPLY CO.	Omaha, Neb.
	Cincinnati, O.	ELYEA-AUSTELL CO.	Atlanta, Ga.
		SOUTHERN HARDWARE & WOODSTOCK CO.,	New Orleans, La.

Insist Upon Wolf's Head Oil— Just As the Motor Manufacturers Do

\$985

F. O. B. Toledo

Completely Equipped:

Self-Starter
30 Horsepower
5-Pass. Touring Car
110 inch Wheel Base
Timken Bearings
Center Control

Overland**\$985**

F. O. B. Toledo

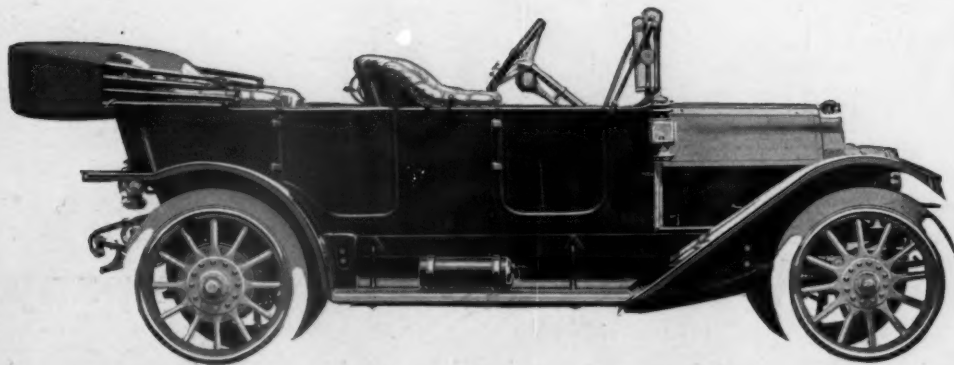
Completely Equipped

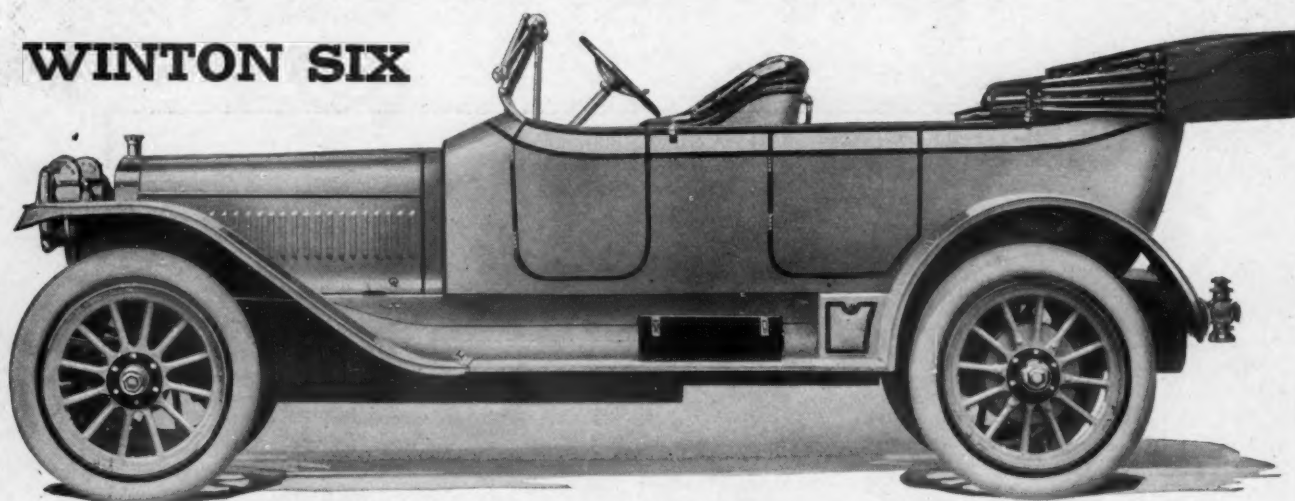
Remy Magneto
Warner Speedometer
Mohair Top and Boot
Clear Vision, Rain Vision
Wind Shield
Prest-O-Lite Tank

THIS year we will sell 40,000 Overlands. We sold 400 in 1908; 4,000 in 1909; 15,000 in 1910; 15,000 in 1911; 28,000 in 1912. Year after year Overland sales grew until they now reach the 100,000 car mark; year after year Overland value has increased. Our prices have steadily decreased as our production cost has been lowered. Elsewhere you must pay \$1200 for a similar car.

Catalogue on request. Please address Dept. 46.

The Willys-Overland Co., Toledo, O.



WINTON SIX**Beauty "Bred in the Bone"**

"Most beautiful car on the market" is what car buyers say about the Winton Six.

And, as every Winton Six owner knows, its beauty is not limited to graceful lines and superb finish, but is "bred in the bone." This best-proved of all sixes has the beauty of right construction—nothing left out that ought to be in and nothing put in that doesn't belong. It has the beauty of strength, of endurance, of durability. It is made right, and it stays right; freeing the owner from risk, worry, dismay, and remorse, and giving him the certainty of continuous satisfaction.

Shall we send you our latest catalog and upkeep book? Write today.

The Winton Motor Car Company

(The World's First Maker of Sixes Exclusively)

424 Berea Road, CLEVELAND, OHIO

WINTON BRANCH HOUSES

NEW YORK.....Broadway at 70th St.
BOSTON.....674 Commonwealth Ave.
PHILADELPHIA.....246-248 No. Broad St.
BALTIMORE.....Mt. Royal at North Ave.
PITTSBURG.....Baum at Beatty St.
CLEVELAND.....1228 Huron Road

CHICAGO.....Michigan Ave. at 18th St.
DETROIT.....908 Woodward Ave.
MILWAUKEE.....62-66 Farwell Ave.
MINNEAPOLIS.....16-22 Eighth St., North
ST. PAUL.....208 West Fifth St.
KANSAS CITY.....1809-1811 McGee St.

SAN FRANCISCO.....401-409 McAllister St.
SEATTLE.....1000-1006 Pike St.
PORTLAND, ORE.....23rd & Washington Sts.
TACOMA, WASH.....1214 Tacoma Ave.
SPOKANE, WASH.....1421 Second Ave.
VANCOUVER, B. C.....1249 Granville St.

100 PER CENT EFFICIENT



ON THE HAYNES CAR

Every owner of a Haynes car knows he can jump into his car, move the gear lever and "get away" without cranking or trouble whatsoever.

THE LEECE-NEVILLE Starting and Lighting System

has for a year been standard equipment on the Haynes car because it never fails to work and is so simple and mechanically perfect that no service men are required.

The Leece-Neville System has proved so successful that it has been copied by several other manufacturers. Though extensively copied, it has never been equalled.

Before you buy a car or install a lighting and starting system, see the Leece-Neville System on the Haynes car.



The Leece-Neville System is the only one powerful enough to furnish current for lights and crank large marine engines, and it is standard equipment on engines of the Loew Mfg. Co., Cleveland, on their famous "Loew Victor."

Descriptive circular will be sent you on request.

THE LEECE-NEVILLE COMPANY
CLEVELAND, OHIO

Here Is the Argo Policy for 1913!

It Spells
Profit and
Prestige
for Argo Dealers Everywhere



First off let us set down the three big principles of the Argo Creed

- FIRST:** We believe that any electric car manufacturer who asks his dealer to assume the advertising burden in his territory is asking him to do a thing which he does not believe—
- SECOND:** Publicity in magazines of general circulation will do much to increase the popularity of a manufacturer's trade-mark, but very little toward adding to the profits of the dealer—
- THIRD:** If a manufacturer conscientiously wishes to help his dealer through publicity he must spend his advertising appropriation in his dealer's local paper and over his dealer's name—

Argo Electrics

\$50,000 will be spent to tell the Argo story—a considerable part of it in your local newspaper over your name—

Just stop to think what this means to you as a dealer—

Besides giving you a car that was created for the future—not rebuilt from the past—we are backing the Argo in your territory with a campaign that will not only create a popular desire for Argo Electrics, but will bring into your showrooms customers already convinced of the superiority of the Argo line—

We have said that competition has never cost us a single Argo sale—and

We repeat that in selling Argo cars in your territory you are representing a product that has forced this competition to admit, even though grudgingly, that the worth of electric vehicles as a whole is measured by close comparison with the Argo standard—

There will undoubtedly be more or less criticism of our high standard of construction until so-called "old manufacturers" discover that the esteem of motor car buyers is worth far more than the jigs and dies of machines which they must discard along with the unsightly and unsafe high carriage construction—

Argo advertisements in your territory are going to send already convinced buyers into either your showroom or your competitors'—

To you, as an Argo dealer, the Argo 1913 selling campaign has a definite value—

It is an asset to your business, or to your competitors'—

The enthusiasm and careful interest that we are displaying for our dealers is going to make possible this effective advertising campaign, and as an Argo dealer you can always point to the product you are selling as one which you can unreservedly guarantee for service and satisfaction—

Write today for the Argo 1913 Sales Plan—

Model A Brougham
108½ inch wheel base
\$2800

Model B Roadster
108½ inch wheel base
\$2500

Model C Brougham
110 inch wheel base fore drive
\$3100

Metzger-Herrington Argo Co., Distributors

Argo Electric Vehicle Co.

FACTORIES:
Saginaw, Mich.

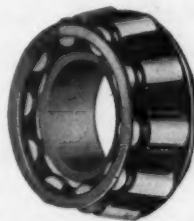
2412-2414 Michigan Avenue, Chicago, Ill.



Hunting the Quarter Thousandth of an Inch No. 2 Setting the Sixteen Traps

- ¶ A quarter thousandth of an inch! A space but one-eighth the thickness of a human hair;
- ¶ Yet no one roller in a Timken Bearing can vary in size from its neighbors more than the quarter thousandth of an inch (.00025")
- ¶ Because, if that roller were 'high' it would stand extra strain and get extra wear; if it were 'low' it would loaf and throw its share of burden on its neighbors.

**Timken
Tapered**



**Roller
Bearing**

- ¶ The Timken automatic gauging machine—the machine of the sixteen traps—sorts the tapered rollers into a series of lots that vary by quarter thousandths of an inch. A machine for every size roller.

Traps Must Be Set Right

- ¶ Master rollers are used to set the traps. When each trap springs to its master roller—and to no other—the machine is set right.
- ¶ The hardened and ground rollers now roll around the disc of the gauging machine and each size springs the trap for which it was set.
- ¶ All day long the machine sorts the rollers and places them in canisters ready to be sealed until used in the Timken Bearing.

Traps Must Stay Right

- ¶ Perhaps after the traps were set some little thing has happened to disturb the fine adjustment of some one trap. Some one canister may contain a few rollers that are not just right. Timken accuracy demands the elimination of that chance.

- ¶ So every two hours each machine is stopped and each trap again tested by its master roller.

- ¶ If one trap is found wrong every roller that has passed through it must come out of its canister and again run the gauntlet of the sixteen traps.

Reason for the Quarter Thousandth

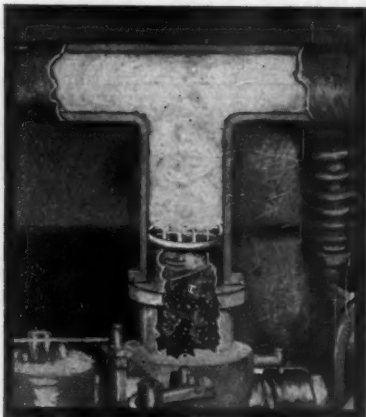
- ¶ The Timken Bearing has always been right in the principles of its design. In the earliest motor cars its unique principles enabled it to give a service that no other bearing could give. This it did without the present day accuracy in manufacture.

- ¶ Year after year the hunt for the quarter-thousandth of an inch has added still longer life, smoother running, lower friction and the transmission of greater power.

The Timken Roller Bearing Company

Canton, Ohio, U. S. A.

The only axle manufacturer licensed to make automobile axles equipped with Timken Roller Bearings is the Timken-Detroit Axle Company



The New Carburetion Method—

Mondex-Helix

Used in combination with
any carburetor

Saves 25 to 40% Gasoline

It gives *far* great motor efficiency and 100% increased flexibility. It *increases* power on hills and all grades at minimum and maximum speeds—from 10% at high speed, to 50% at low speed—particularly on heavily loaded vehicles.

It makes a noisy motor *silent* and *smooth* running. It prevents back-firing and carbonization. It minimizes wear and tear. It almost *doubles* the power of poor gasoline.

It needs no attention—has no revolving, moving or complicated parts. It is adaptable to *all kinds* of motors—being simply inserted in intake of manifold like a cartridge in a gun.

The fact that it is used by the largest automobile concerns—we enumerate the following at random—is *positive proof* that Mondex-Helix will do all and *more* than we claim:—

Knox Automobile Co., "I-T-O-A.," Consolidated Gas Co., N. Y.; Selden Motor Vehicle Co., Regal Automobile Co., Inc.; Western Electric Co., Long Island Railroad Co., Mason-Seamon Trans. Co., Ford Motor Co., United States Motor Cab Co., and hundreds of others.

Sizes for any carburetor will be sent with full instructions, C. O. D. or by mail on receipt of price.

Sizes, 1 inch to 1 1/2 inches... **\$3**

Sizes, 1 5/8 inches to 2 inches... **\$4**

Agents Wanted

Mondex Shock Preventers

Won the Vanderbilt Cup for Mulford and for R. De Palma; the Grand Prize for the late David Bruce-Brown and for C. Bragg; and the Tiedeman Trophy for Witt.

The Mondex Shock Preventers are superior to and will outlast any others and yet are not more costly.

Motor Car Racing Says: "Mondex Shock Preventers proved they are right—in the highest court of mechanical test known to the automobile engineering world."

Their use saves wear of tires many times and eliminates all vibration.

THE ARISTOS CO.
251-7 W. 54th St., New York, N.Y.



SCHRADER UNIVERSAL VALVES

Established 1844

Trade Mark Registered April 30, 1905

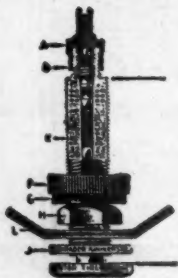
—SIMPLE AND ABSOLUTELY AIR TIGHT—

Schrader Motor Valves, as shown in cut, are the regular equipment for G & J Motor Tires, Hartford Dunlop Clincher Motor Tires, Fisk Detachable Motor Tires and New Goodyear Detachable Motor Tires. Our No. 777 Motor Tire Valve is the standard for 2 1/2-inch and 3-inch Motor Tires, and our No. 725 Motor Tire Valve is the standard for tires larger than 3-inch.

SUPPLIED TO THE TRADE BY ALL TIRE MANUFACTURERS

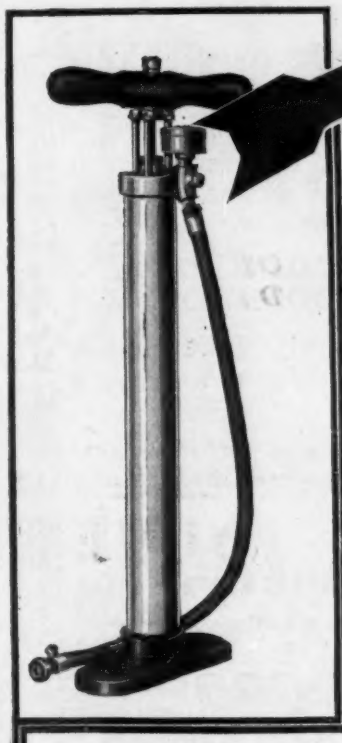
—MANUFACTURED BY—

A. Schrader's Son, Inc., 28-30-32 Rose Street, **New York**



When Writing to Advertisers, Please Mention Motor Age.

The Best Cars Have Them
All Cars Should Have
F & S Ball Bearings
BRETZ COMPANY SOLE IMPORTERS
250 West Fifty-fourth, New York.

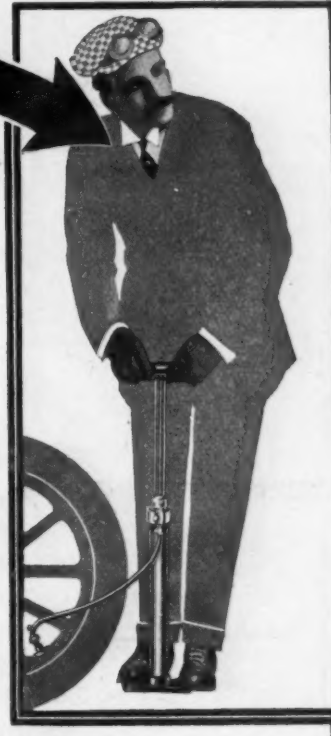


ALWAYS READY. ALWAYS WORKS

STAPLEY TIRE PUMP

A compound pump with a seamless brass tube cylinder. It can't rust or break. Has heavy cast base. Automatic valve opener—non-leakable joints.

One STAPLEY will outlast and outwear five ordinary pumps. Therefore, the STAPLEY is the pump to use. You inflate your tires quickly and easily and you do so at less cost than with any other pump on the market.



Get Your Stapley Today—Without Gauge, \$4.00; with Gauge, \$6.00

BRIDGEPORT BRASS CO., P. O. Station A, Bridgeport, Conn.

A Few Miles of Concrete Highway Leading into Town and Around It



would add immeasurably to the pleasure of motoring in your vicinity, to say nothing of the commercial advantage to your city. Hard roads are a necessity for motor car traffic. They alone can stand the wear and tear of rapidly moving wheels which pull the fine particles out of the macadam and scatter it as dust to the winds.

Concrete Roads Are Economical

Their first cost is low compared with any other kind of material. They last indefinitely, are neither dusty nor slippery. Heat, cold, moisture, drouth do not affect them. Maintenance charges are surprisingly small.

Our free booklets on the use of concrete in road construction may be had for the asking.

Universal Portland Cement Co.

CHICAGO — PITTSBURGH — MINNEAPOLIS

PLANTS AT CHICAGO AND PITTSBURGH
ANNUAL OUTPUT 12,000,000 BARRELS



What Killed the Cow?

THE FARMER, you remember, fed her sawdust because it was cheap. She liked it fine, but just as she was getting used to it, *she died.*

Your automobile needs GOOD OIL more than the cow needed GOOD FOOD.

The *best* comes from a certain selected Pennsylvania crude oil, but there isn't enough produced to supply one-tenth of the cars of this country.

You can get *yours.* We control over half the available supply of this oil. We sell it under the name

**Autlubo
"THAT
GOOD
OIL"**

Write us today for book giving facts about motor lubrication. It's yours for a postal.

THE MOORE OIL CO.

1840-1870 York Street

CINCINNATI, OHIO

Branches at Logansport, Ind., and Columbus, O.

and we don't tack on a fancy price. Just what you'd pay for ordinary "good oil."



\$1.00

each, from your
dealer or direct

Bosch Plugs

As Good As Bosch Magnetos

THERE'S a difference between results obtained from any spark plug and the right spark plug, one possessing every refinement of manufacture, every result that extensive investigation could produce, nothing omitted—nothing neglected.

Why experiment when you buy? The mere selection of the Bosch Plug gives you the best plug, the plug which by universal selection of men who know is renowned as the right plug. Buy the Bosch Plug.

Write today for "Locating the Spark Plug."
It tells you all you should know about plugs.

BOSCH MAGNETO CO.

214 West 46th Street, New York

Chicago

Detroit

San Francisco

Toronto

TRANSMISSIONS

CLUTCHES

STEERING GEARS

"The Value of Our Product Is Not in Its Price—But in the Service Rendered"

"OF QUALITY"

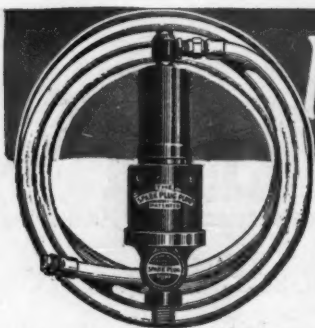
WARNER GEAR CO., Muncie, Ind.

DETROIT OFFICE—628 FORD BLDG.

DIFFERENTIALS

CONTROL LEVERS

When Writing to Advertisers, Please Mention Motor Age.



MOTOR IN COMFORT

Use This Pump's Muscles — Save Yours

Harness a SPARK PLUG PUMP to your motor and watch it do the work. No exertion, no dirt, no oil, no delay. Attached in a minute's time by simply substituting for any spark plug.

THE MAYO SPARK PLUG PUMP

Inflates largest tire made in from 2 to 4 minutes. Pumps nothing but pure air.

Made with metal rings like your motor, and will last as long. Adapted to all size cars, from the

smallest Ford to the largest Lozier. Weighs only 2½ lbs. Complete with 12 ft. of hose and connections.

Price..... \$10.00

PRESSURE GAUGE,
\$2.00 EXTRA

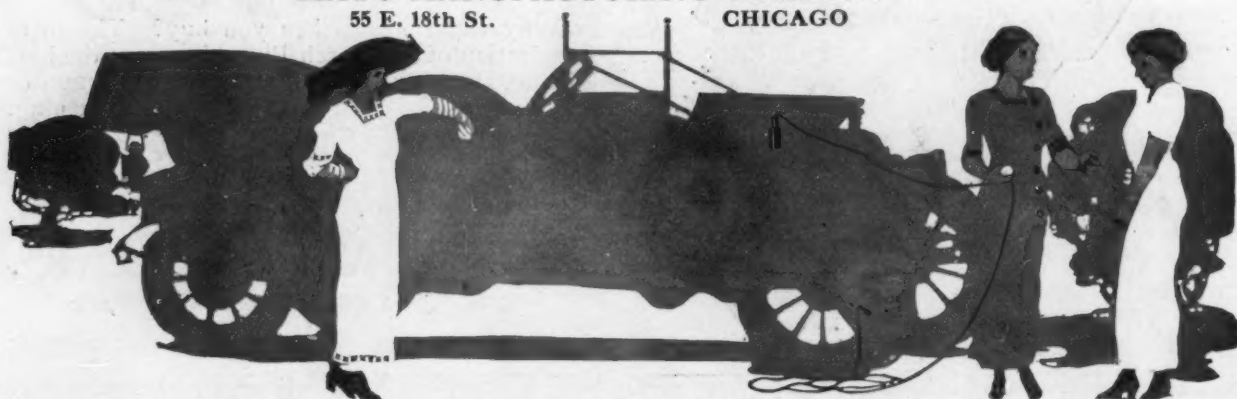
TRY ONE FREE ON YOUR CAR BEFORE PURCHASING

WRITE FOR PARTICULARS

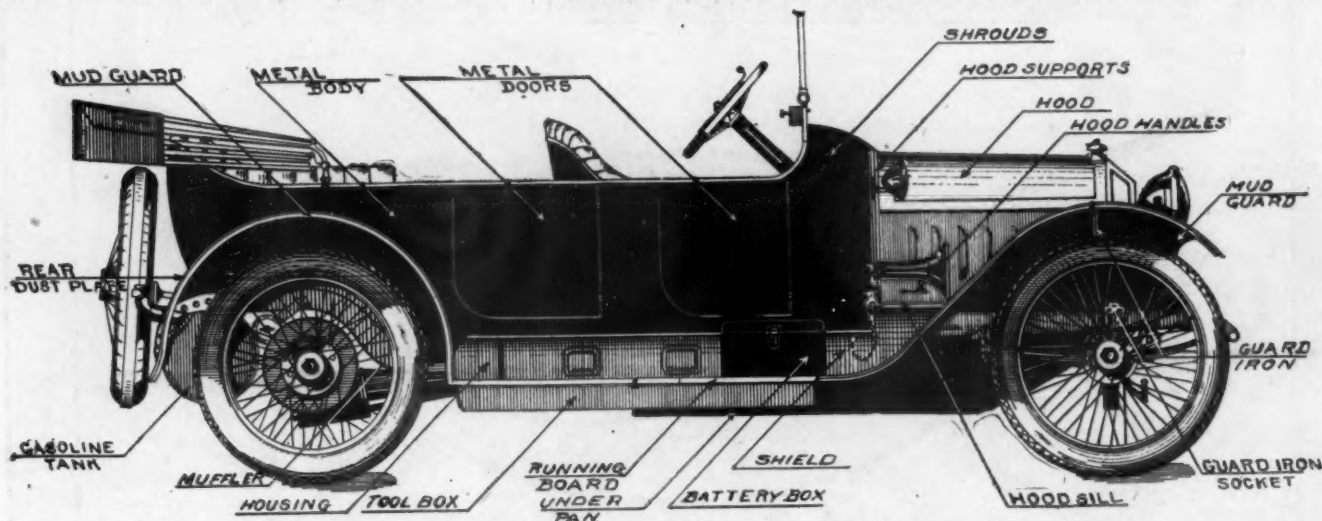
MAYO MANUFACTURING COMPANY

55 E. 18th St.

CHICAGO



EFFICIENCY IN AUTOMOBILE MANUFACTURING



The new Edwards-Knight Car, Designed by the Edwards Car Company

One of the cardinal principles of industrial efficiency is specialization. Do one thing and do it well—that's what it means. An Automobile is apparently one thing, but from the manufacturing standpoint, it is very complex. We manufacture only a single unit of the automobile—the sheet metal parts. These are twenty in number—but the same nature underlies them all.

Hayes sheet metal parts are built into nearly every automobile made. We're the largest users of sheet metal parts in the world.

We do one thing only—and do it well. That's the reason.

HAYES MANUFACTURING COMPANY

Detroit; U. S. A.

TO MAKE YOUR CAR RIDE EASY USE

GABRIEL REBOUND SNUBBERS

They are the one shock preventing device adapted to the high-set flexible type of spring now universally in use. They check the excessive rebound caused by rough roads and stop bouncing and jolting without spoiling the resiliency of the springs on smooth roads.

LEADING CARS USE SNUBBERS AS STANDARD EQUIPMENT

Every motorist who appreciates the maximum of comfort and service from his car and reduced upkeep expense should invest in a set of Gabriel Rebound Snubbers. Among the good features of this device are ease of attachment, no noise or rattle and no adjustment required.

SEND FOR CATALOGUE AND ASK ABOUT AGENCY

GABRIEL HORN MFG. CO., 1415 East 40th St., CLEVELAND, OHIO



"AUTO-LITE"

OUR PRODUCTION FACILITIES ARE ADEQUATE FOR EVERY DEMAND

WE have nearly 100,000 square feet of floor space devoted exclusively to the manufacture of "Auto-Lite" electrical starting and lighting systems for automobiles. Our plant is the largest of its kind in the country.

The machinery we use in manufacturing the "Auto-Lite" devices is the most modern and economical obtainable. It is entirely automatic—and accurate to one-half of one-thousandth of an inch.

Our facilities are such that we can take care of the largest order on the shortest notice. Our reputation for years of success in the electrical manufacturing field is back of our absolute guarantee of superior service.

The "Auto-Lite" system is simple, efficient and practical. There are but two units, mechanically independent and operating on a six-volt current.

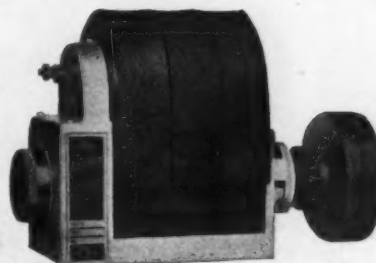
Our capacity for prompt service on large orders is of the greatest importance to manufacturers.

We have an especially attractive proposition, on lighting alone, for dealers.

Prospective automobile purchasers should know which starting and lighting system they will want on their new car.

We will send our illustrated catalogue and literature describing the "Auto-Lite" device in detail, on receipt of request. Write today.

THE ELECTRIC AUTO-LITE COMPANY
MAIN OFFICE AND FACTORY, TOLEDO, OHIO
BRANCHES: NEW YORK, KANSAS CITY, SAN FRANCISCO





A Century's Progress in Wrench Making

The crude implement that served as a wrench 100 years ago emphasizes the perfection of the drop-forged, tempered steel

Billings & Spencer

"The tools that are guaranteed"
WRENCH

—recognized by machinists in general as the last word in wrench making.

Critical selection of steel, perfect drop forging of parts, and micrometrical exactness in assembling, make possible the "guarantee of a lifetime of service" under which it is sold.

Write for Catalog and prices

BILLINGS & SPENCER COMPANY
Hartford, Conn.



IN EVERY TOOL BOX

A Jack, A Tire Pump and an
O-TAK-A Tire Remover

Price
\$3.00



The O-TAK-A Tire Remover has become as great a motoring necessity as a jack or a tire pump. On the principle of leverage one movement of its handle serves to dislodge a tire. No more struggling in the dirt and heat trying to pull a tire off with your hands. It leaves both hands free. No more delays on the road. No more tire temper.

The O-TAK-A is adapted to either clincher tires or tires equipped with standard



HOW IT WORKS

Q. D. rims. It can't slip. As good as 2 extra hands for putting on over-size shoes, and shoes with inner liners.

The tool does not come in contact with the wooden rim or spokes of the wheel—will not mar the paint. Anyone can operate it.

MADE IN TWO SIZES

No. 1 for Tires 4½" and Under No. 2 for Tires 4½" and Over

PRICE \$3.00

At all dealers and jobbers, or direct on receipt of price.

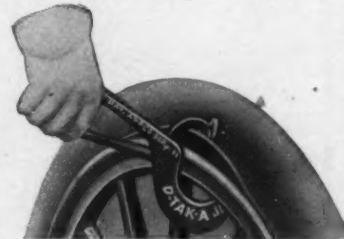


Price
\$1.50

O-TAK-A Junior
For Ford, Metz and Brush Cars

The O-TAK-A Junior is designed for removing all types of clincher tires. It is specially adapted to Ford, Metz and Brush cars. Use it once and you'll never be without it. It will pay for itself on your first touring trip.

Removes tires which are rusted on or frozen to the rim—as if they were greased. Price \$1.50 at all dealers and jobbers, or direct on receipt of price.

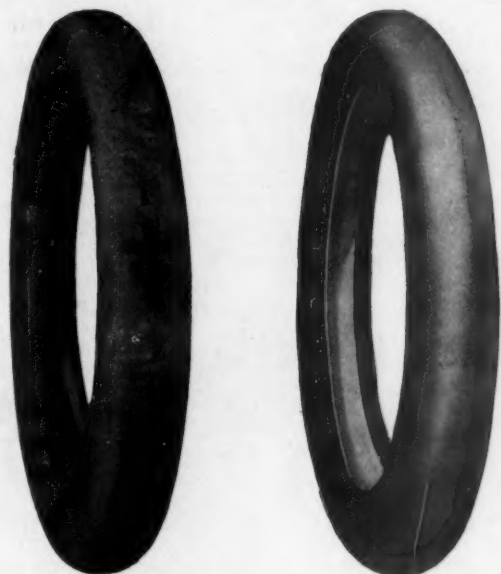


IN ACTION

DEALERS: Here is one of the fastest selling little accessories on the market. Something every motorist needs and buys on sight. If big sales appeal to you, write us now. Territory is going fast.

O-TAK-A Tire Remover Co., LeRoy, N. Y.

DOUBLE YOUR TIRE MILEAGE WITH DRY CURE TREADS



BEFORE

AFTER

DRY CURE TREADS are nothing more than thick, tough rubber treads—just like the one on the tire when you bought it. It is the PROCESS that is different, and by no other process than that of DRY CURING can retreading be made a success.

Drop us a line and get a booklet on DRY CURE TREADS; or, better still, send in a tire by express and have us tell you what we can do with it.

Remember — DRY CURE TREADS are GUARANTEED to deliver 2000 miles of wear. Their possible life is 5000 miles.

ATTENTION--DEALERS AND REPAIRMEN

If you are not operating a tire repair department, YOU ARE LOSING OUT!

You may have had poor success with "kettle curing" and "air bags," but why condemn a profitable industry without first investigating the HAYWOOD System.

Get a HAYWOOD Plant. Become our representative in your district for DRY CURE TREADS.

You want to make money in 1913. Here is your chance. Write for catalog "B" today.

HAYWOOD TIRE & EQUIPMENT COMPANY

501 North Capitol Avenue

Indianapolis, Indiana

Which Magneto?

How One Great Firm Decided the Question

Hit or miss methods will not do for the house of Rudge Witworth in Coventry, England, the largest English manufacturers of motor-cycles and cycle-cars. Not satisfied to equip their splendid cycles with a Magneto simply because it *looked* to be best or because people *said* it was best, they determined to make an exhaustive analysis of the various Magnetos on their own account. They wanted to *know* beyond question that their equipment could not be surpassed.

Their chief engineer, Mr. Holroyd, was delegated to examine into the matter. He visited practically every Magneto manufacturer on the Continent, naturally including in his trip Stuttgart, the center of the entire world in Magneto production.

While in Stuttgart, Mr. Holroyd called at the Ruthardt plant, the home of the HERZ MAGNETO. He was shown everything from raw material to finished product, including the elaborate testing plant, where a diagram is taken from every Magneto built. Mr. Holroyd stated that no other factory he had visited had such complete facilities for testing, that most of them had none at all and no diagram indicator, and some did not even know what the latter was.

When we say that HERZ MAGNETOS were selected by Rudge Witworth under these conditions, the statement needs no comment.

HERZ MAGNETO gives a strong, hot spark under fuel compression at 35 R.P.M. as against 45 R.P.M. for the best of the other makes. Its superior efficiency and serviceability are beyond all question.

HERZ & CO.
295 Lafayette St.
NEW YORK



FORD OWNERS

Here Is The

"BLITZ"

Ignition System

Made for your car

It Stops all of Your Ignition Troubles

No more Sticking of Platinum Points

No more Burned Out Timers

No more Missing. Every miss means a strain on every part of your car, even to the tires.

The "Blitz" is a gear-driven sparking device, which fits on the front of the Ford Engine, connects to one unit of the coil on the Dash, and no machine work is necessary to attach it.

Results Count:—Uniform Spark, Perfect Timing, More Power, Smooth Running, Easier Starting.

Positively Eliminates the Back Kick

If your dealer cannot supply you write us. Delivered to any part of U. S. upon receipt of Price, \$20.00.

Electrical Specialties Mfg. Co.
Omaha, Nebraska



How Old Style Tanks Waste

Gasolene stored above ground fluctuates with the temperature—15° to 20° every twenty-four hours. The fluctuation causes vapor to form in the container for the same reason that mist or fog forms on a body of water.

You cannot prevent this vapor from forming, as there is no "air-tight" above ground container. This vapor is the driving power of your gasolene.

Get All the Gasolene You Pay For

Store it underground where the temperature hovers close around 57° all the year round. Gasolene is too high priced to waste.

As Good as An Insurance Policy

Bowser Systems are made to conform to that measure of safety prescribed by the National Board of Fire Underwriters.

Write for our interesting free illustrated book and we will tell you where you can examine a Bowser Outfit and see for yourself its economy and convenience.

S. F. Bowser & Co., Inc.

Home Plant and General Offices
Box 2126, Ft. Wayne, Ind., U. S. A.

BRANCHES

Atlanta Denver St. Louis
Chicago, Minneapolis, San Francisco
Dallas New York

Albany Harrisburg Toronto

Original patentees and manufacturers of standard, self-measuring, hand and power driven pumps, large and small tanks, gasolene and oil storage and distributing systems, self-registering pipe line measures, oil filtering and circulating systems, dry cleaner's systems, etc.

Established 1885.



You Should Know More About the Stutz

Any manufacturer can build a beautifully finished and luxuriously equipped car—but the real worth of a car comes in the construction.

The STUTZ is made right from the radiator to the rear axle. Every ounce of material—every detail of workmanship that goes into every STUTZ car is absolutely the best.

The STUTZ has a powerful motor that will pick up on any road or hill at the touch of the throttle. It has attained a record second to none for consistent performance.

Every STUTZ car is exceedingly easy-riding and comfortable. The straight line low slung body, deep upholstery and luxurious appointments of the STUTZ give it that aristocratic design which lends dignity and quality to a high class motor car.

STUTZ MODELS

Six-cylinder, six-passenger, touring car...\$2,300
Six-cylinder Roadster.....\$2,250
Four-cylinder, six-passenger, touring car...\$2,050
Four-cylinder, four-passenger, touring car...\$2,000
Four-cylinder Roadster.....\$2,000

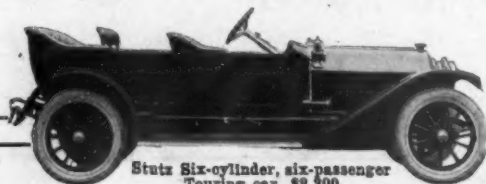
Write today for the STURDY STUTZ catalog A-2.

THE IDEAL MOTOR CAR COMPANY

Manufacturers of Stutz cars

Indianapolis

Indiana



Stutz Six-cylinder, six-passenger
Touring car, \$2,300

REMY

Electric Company

(With a country wide system of branches and service stations)

Designers and Builders
of

**High Grade
Starting and Lighting
Equipment For Motor Cars**
(Sold to car makers only)

Makers of magnetos for fourteen years

Our country-wide service is available to each user of Remy equipment

Write us today about our magneto exchange offer. We will make a liberal allowance for old equipment (any make)

REMY

Pioneer Manufacturers of Ignition Equipment

Factory and General Offices:
Anderson, Indiana



THE real index of merit in a spark plug is the quality of its porcelain. The majority of spark plugs wear out and become inefficient because their porcelains are unable to stand the excessive jolts and heat to which the cylinder subjects them.

EMPIRE porcelain has been prepared to stand rough usage because it is manufactured at a temperature of 2600 degrees Fahrenheit, a greater heat than any spark plug is called on to stand in actual service. Made of the best imported kaolin, scientifically prepared for severe tests, EMPIRE porcelain solves once and for all the spark plug question.

Write for our Catalogue.

Empire China Works
142-156 Greene Street
BROOKLYN, N. Y.

EMPIRE

Chrome Vanadium Steel

During the year 1913 there will be more than 100,000 automobiles manufactured in which the springs and other small parts will be made of Chrome Vanadium Steel of our make.

The rough automobile usage subjects Chrome Vanadium Steel to its most severe service test and it is this important test that has evidenced the excellent quality of our product.

Our Chrome Vanadium Steel is made under our own secret process, patents for which are now pending.

May we tell you how to overcome your breakage troubles?

The United Steel Co.
Canton, Ohio

New York

Chicago

Detroit

Cincinnati

How the motor car builder avails himself of the superior qualities of

TRADE MARK REGISTERED IN
NON-FLUID OIL
UNITED STATES PATENT OFFICE

He uses his utmost skill and discrimination in equipping his cars with friction-proof and long-lived bearings in the wheels, along the driving shaft, in the transmission and differential — everywhere.

Then he finds the lubricant which will safeguard the serviceability of his cars. HE RECOMMENDS NON-FLUID OIL.



What do you do to safeguard your investment when you purchase his car?



Isn't it well worth while to accept his carefully studied recommendation?

The engineering departments of over seventy motor manufacturers have investigated lubricants and adopted NON-FLUID OIL.

THINK THIS OVER

In the meantime send for a free copy of "MOTOR CAR LUBRICATION," a book which will emphasize the mistake of indifference in selecting lubricants. It contains a valuable LUBRICATING CHART.

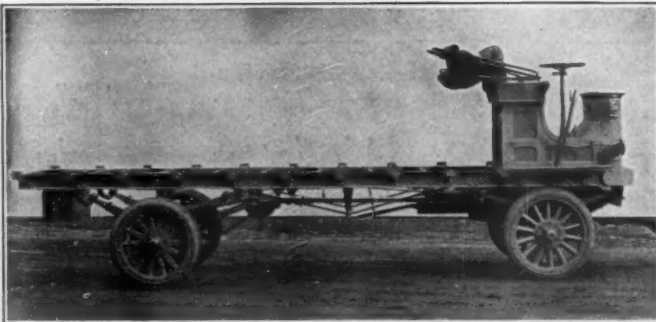
New York & New Jersey
LUBRICANT

165 Broadway, New York

CHICAGO—1430 Michigan Ave. PHILADELPHIA, 1431 Vine St.

Pacific Coast Distributors:

HUGHSON & MERTON San Francisco Los Angeles Seattle Portland



Johnson Trucks

1-Ton
2-Ton — Chasses
4-Ton

Write for Specifications

JOHNSON SERVICE CO., Milwaukee

BADGER Gear Compound

will give more real satisfaction—in lubrication and prevention of wear on gears—than you ever thought possible. It will—simply because it's made different.



Stays where you put it, right square on the gear teeth. Will not pack the sides of the gear case. Every ounce lubricates. Makes your engine deliver its utmost efficiency, all the time.

STOPS NOISE—LESSENS WEAR

Stops the noise and makes transmissions keep quiet—something that will do more than any other one thing to keep your car from getting old before its time. No car owner can afford not to give Badger Gear Compound a trial. We also make the popular F. V. Motor Oil and the Badger Lubricants. See your dealer or write us.

Dealers, Write for Territory

Wadhams Oil Co., Milwaukee, Wis.

THE REASON *The* BUCKEYE SURE-STARTER Saves 25% of your gasoline

NO more churning and grinding until your back is lame trying to start your car. Just prime your motor with a "Buckeye Sure Starter." Then one turn of the crank—and you are off.

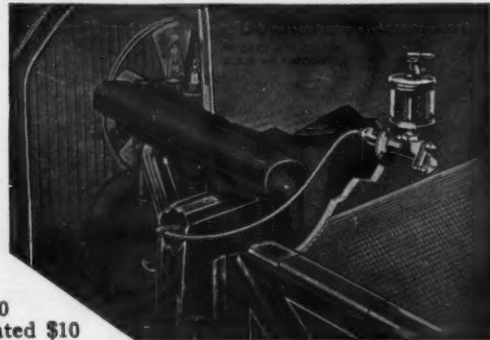
Shifting the air control lever to the right admits to the manifold a "just right" amount of air for a mixture of highest efficiency and guarantees you a 25% increase of power and a 25% saving of gasoline. Carbonization is effectively prevented by feeding kerosene to the cylinders through the "Sure Starter" once a week.

The "Sure Starter" will soon pay for itself in fuel economy alone.

Price is within the reach of every motorist.

Anyone can readily attach in one hour's time.

Price complete:
Brass \$9.50
Nickel Plated \$10



Absolutely Guaranteed or Money Refunded
AT ALL DEALERS OR DIRECT ON RECEIPT OF PRICE
WRITE FOR FURTHER INFORMATION
Competent, wide-awake dealers wanted everywhere
The Central Brass & Fixture Company
Dept. M, Springfield, Ohio



The Only Way

to know how much gasoline or "juice" you are using per mile is to have an exact mileage recorder like the VEEDER HUB ODOMETER.

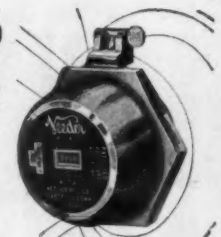
Neat, durable and compact, it can be easily attached. Price complete

\$25.00

At your dealer's, direct from our factory or at the following agencies:

T. H. Cranston & Co., 56 E. Randolph Street, Chicago, Ill.

Bernard I. Bill, 543 Golden Gate Avenue, San Francisco, Cal.



The Veeder Manufacturing Company

C. H. VEEDER, President D. J. POST, Treasurer
H. W. LESTER, Secretary
HARTFORD, CONN.

Makers of Cyclometers, Odometers, Tachometers, Tachometers, Counters and Small Die Castings

Heart, Lungs & Liver

of your car—that's what your motor is—and then some! Worth while getting the advice of, say, a score of automobile engineers. That's what you get when you get a BUDA Motor. The way to get a BUDA is to INSIST on a

BUDA

MOTOR

"the part that sells the car"

Pleasure Cars:

Hudson Motor Car Co.
Michigan Motor Car Co.
Henderson Motor Car Co.
Lenox Motor Car Co.
Schacht Motor Car Co.
Spaulding Mfg. Co.
Croston Motor Co.
Nova Scotia Carriage and Motor Car Co.
Miller Motor Car Co.
—and others.

It was only after careful investigations that the partial list of discriminating manufacturers here shown asked us to make motors for them.

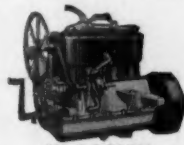
Trucks:

Service Motor Car Co.
Bowling Green Motor Car Co.
Durant-Dort Carriage Co.
Hewitt-Ludlow Auto Co.
Tiffin Wagon Co.
Brantford Motor Truck Co.
W. Landshaft & Sons
Harvey Motor Truck Co.
Horiburt Motor Truck Co.
Schacht Motor Car Co.
Chicago Pneumatic Tool Co.
Lord Baltimore Motor Car Co.
Bessemer Motor Truck Co.
U.S. Government and others.

The BUDA "Little Six" — 3¼ in. bore, 5½ in. stroke will be ready for delivery by April first and is a product worthy of the Company which was the Pioneer of the "Cast-in-Block" method in U. S.

1913 Specifications

Model "T" Motor, 4¼x5½ Model "O" Motor, 4¼x5½
Model "Q" Motor, 3¼x5½ Model "M" Motor, 3¼x4½
Models "T", "O" and "Q" are also furnished in unit power plant type of construction.
Long stroke. Enclosed valves. Noiseless timing gears. Self-contained positive oiling system. Extra large valves and bearings.



Model "Q"

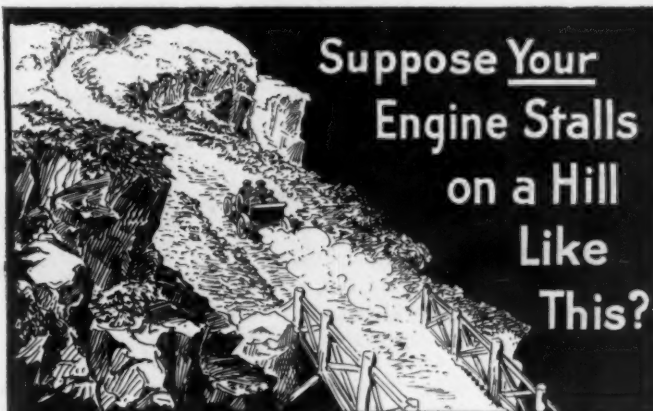
SEND FOR SPECIAL BULLETIN

BRANDENBURG & CO.

1108 So. Michigan Ave.
CHICAGO

Ford Building
DETROIT

57th Street & Broadway
NEW YORK CITY



Suppose Your
Engine Stalls
on a Hill
Like
This?

This may happen any day. Then your life will actually depend upon your brake lining.

Are you going to "chance it" with an ordinary lining? Or will you safeguard yourself by lining your brakes with

J-M NON-BURN BRAKE LINING

This lining grips the brake drum firmly and locks wheels almost the instant you apply the brakes. It never slips. Yet by applying less pressure you can stop as gradually as you desire. J-M Non-Burn is made of pure asbestos fibres interwoven with strong brass wires. No perishable material in it. It can't char, burn or rot. And oils, gasoline, grit, water, etc., cannot affect it. Outlasts 12 ordinary linings.

Sold by most dealers. Shipped direct if not at your dealer's. Name on every piece.

Write our nearest branch for sample and booklet

W. H. JOHNS-MANVILLE CO.

Albany	Chicago	Detroit	Louisville	New York
Baltimore	Cincinnati	Indianapolis	Milwaukee	Omaha
Boston	Cleveland	Kansas City	Minneapolis	Philadelphia
Buffalo	Dallas	Los Angeles	New Orleans	Pittsburgh
Seattle	St. Louis	San Francisco	Syracuse	1916

The Canadian H. W. Johns-Manville Co., Ltd.,
Toronto, Montreal, Winnipeg, Vancouver

Go Motor Gloved!



Now is the time to think of your hands. Don't mar your summer motoring pleasure by ill-fitting, sweaty gloves. Keep cool hands at the wheel, have clean hands after making repairs.

You'll find the best gloves and the coolest are

Grinnell-Gloves

Sold with a Bond

Made for motorists. They "fit the hand." Roomy, shapely, smoothly seamed inside. Coltskin and "Reindeer" stock. Soft as kid, and wear like rawhide. Light on the hand and very flexible. And then, they're

Ventilated

Rows of tiny holes along backs of the gloves admit the breeze but not the dust. Perspiration is evaporated and the hands kept dry and cool. The "Rist-Fit"—V of soft leather in cuff with strap of leather for easy adjustment, keeps glove snug at wrist and gauntlet always in place. A motoring glove of utmost grace and comfort. Sold in almost every city. See them—also our street and dress gloves—at your dealer's.

Morrison-Ricker Mfg. Co.

Established 1856

64 Broad Street, Grinnell, Iowa



Style
V 4090

Write for Free
Glove Book

Give dealer's name and get our "Pair on Approval, Pre-paid" offer and free samples of leather.

Everything Electrical for Automobiles

The Nerve System of Your Cars

will respond to the slightest touch if equipped with

Western-Electric PITTSFIELD

Ignition Apparatus

MAGNETOS

Contain no revolving wires or parts to shake loose. High tension current is generated in coil at rear of machine. Straight and dual types for all sizes of engines.

SPARK COILS

Composed of single units for each cylinder of engine. Units can be removed without taking box from dash. Equipped with a vibrator of entirely new design that is the fastest and most economical made.

SPARK PLUGS

Porcelain, Mica, and Mica-Porcelain Plugs with all standard sizes of threads.

DESCRIPTIVE BOOKLETS ON REQUEST

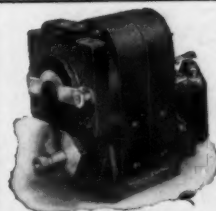
Manufactured by

PITTSFIELD SPARK COIL CO.

Distributed by

WESTERN ELECTRIC COMPANY

Offices in All Principal Cities



When Writing to Advertisers, Please Mention Motor Age.

Attention! Halladay Owners and Agents

THE undersigned wishes to announce that he has just purchased the business of the Streator Motor Car Company, has reopened the factory and is continuing the manufacture of HALLADAY CARS.

The Service Department is now open with a complete stock and we are able to make prompt shipment on all orders.

Owing to the lateness of the season only a limited quantity of cars will be manufactured this year. If you want a 1913 HALLADAY communicate with us at once.

MODEL "32"

Rutenber motor, electric lights and starter, full equipment.....Price \$1450.00

MODEL "40"

Rutenber motor, electric lights and starter, full equipment.....Price, \$1935.00

Competent engineers are now at work on the 1914 models, announcement of which will be made later.

Respectfully,

A. C. BARLEY

Manufacturer of HALLADAY AUTOMOBILES
STREATOR, ILLINOIS

The *Pilot* "THE CAR AHEAD"

Three Great Models: Pilot 40—Four cylinders, 4½x5; brake test, 55 horse-power; 120" wheel base; price, \$2000. Pilot 50—Four cylinders, 4½x6; brake test, 59 horse-power; 126" wheel base; price, \$2250. Pilot 60—Six cylinder, 4x6; brake test, 67 horse-power; 132" wheel base; price, \$2500.

The Car Without a Mechanical Defect

Teetor "T" head motors, full floating rear axles, Brown-Lipe differential, Warner transmission, Elsemann magneto, Stromberg carburetor, handsome jewel bodies with ventilating windshield. Completely equipped, with every convenience and comfort. Dynamo electric lighting and electric starter (Gray & Davis system), power tire pump. We have the greatest agency proposition in the United States.

Write for our beautiful art book showing cars in detail
PILOT CAR SALES COMPANY, Richmond, Indiana

"Imperial Twelve" Garage Compressors

A high-class car equipment deserves high-class garage equipment. The quality of these little compressors is such as to appeal to the most discriminating buyers.

Booklet 608



Ingersoll-Rand Company
New York London

The TEMCO Auxiliary Spring

Add easy-riding qualities to the economy and convenience of your Ford car and get the maximum service from your investment.
You can do this by equipping your Ford with TEMCO AUXILIARY SPRINGS.
TEMCO AUXILIARY SPRINGS equalize the strain on the main spring, take care of all variable loads, and insure motoring comfort on any road. Special proposition for Automobile Dealers. Write for it.

The Temco Electric Motor Co.,
Leipsic, Ohio

The flame is always just this high when you use

The Prest-O-Lite Automatic Reducing Valve

With this device attached to your Prest-O-Lite, you do not have to turn the tank valve up or down to get the correct flame in the lamps.
Turn on the gas, light your lamps, and the flame is bound to be just right, without any adjusting.
It pays for itself in gas saved, so its convenience costs you nothing.
Unlike other reducing valves, the Prest-O-Lite Automatic gives the correct gas pressure at all times, whether the tank is full, half full, or nearly empty. It is truly automatic in its action.
Anyone can attach it in less than five minutes.
Your dealer has it or will quickly get it for you. If not, we'll send it to you on receipt of price. Try your dealer first. Every Prest-O-Lite Branch Office has this Automatic Reducing Valve in stock.

Price \$3.00

The Prest-O-Lite Co.
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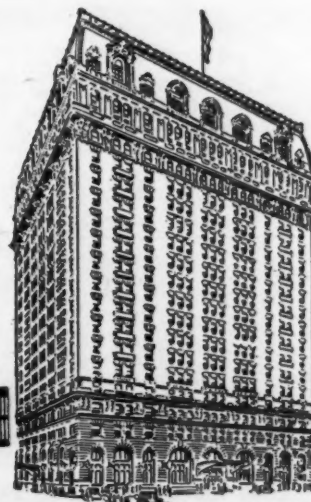
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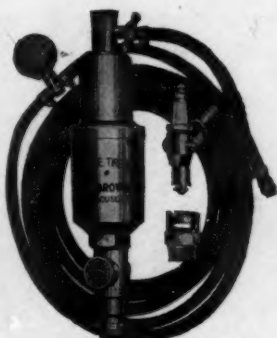
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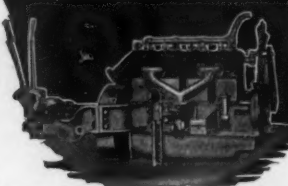
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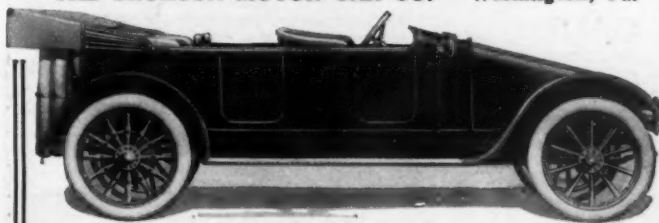


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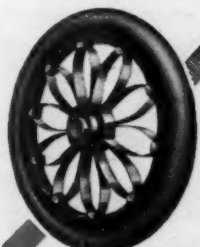
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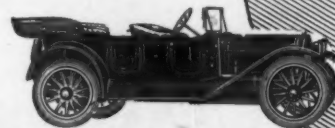
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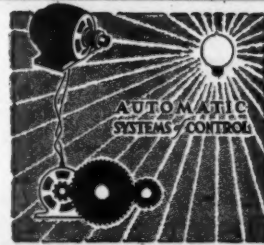
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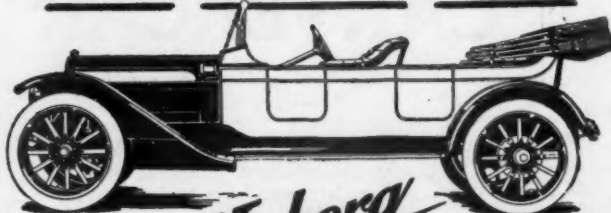
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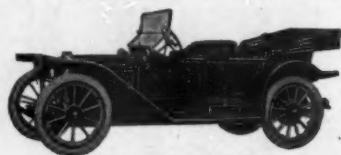
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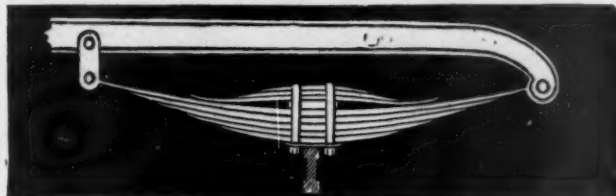
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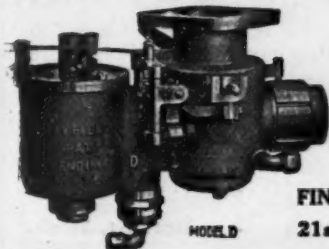
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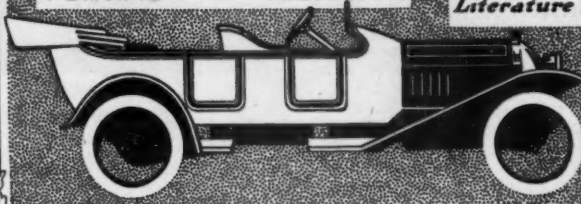
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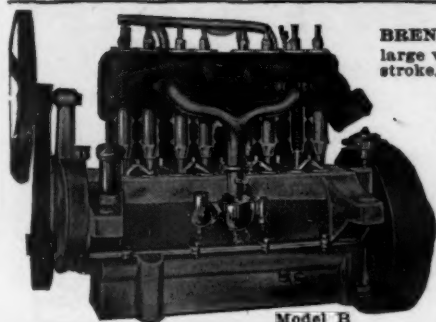
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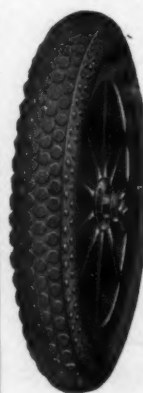
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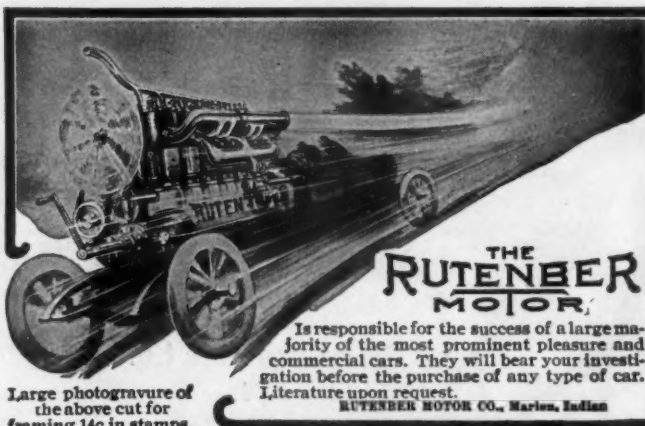
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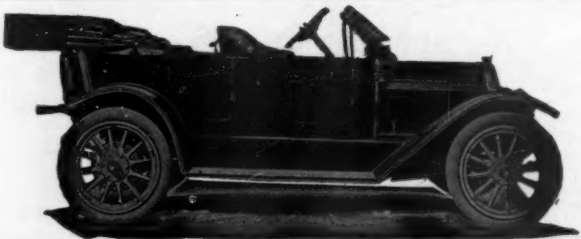


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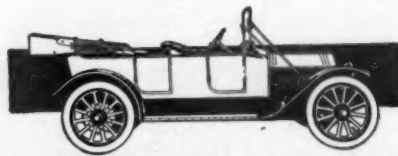
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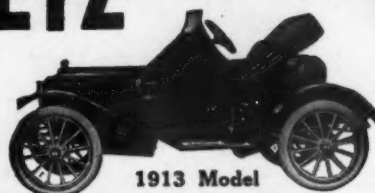
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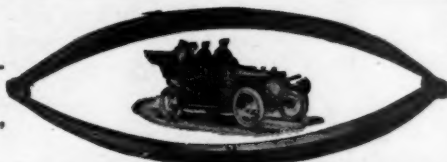
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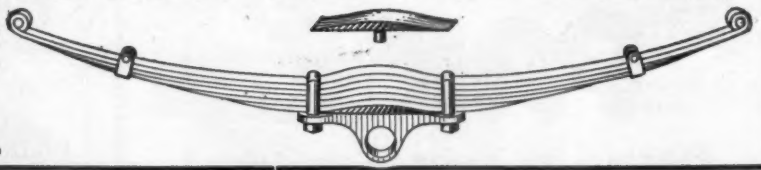
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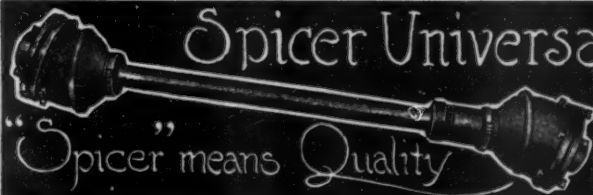
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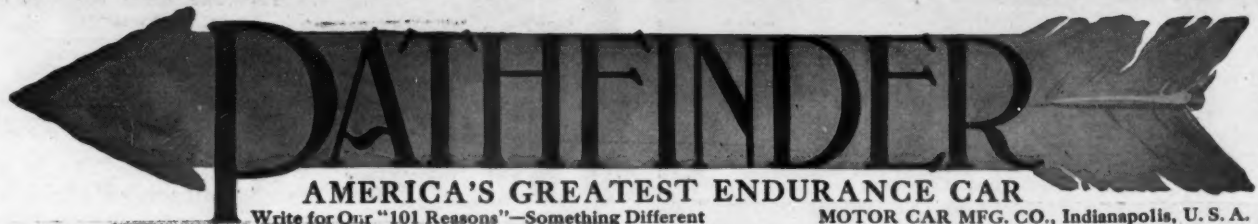
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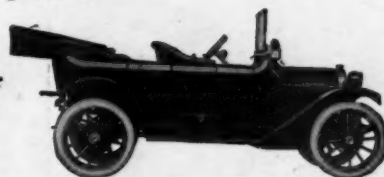
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¶ HESS Axles have been on the market but 2 years. Fourteen car manufacturers in that short time exclusively adopted them as regular equipment.

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We are specializing this combination for Ford cars, but equipment for other cars can be had at a saving that will vitally interest you.

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All brass windshields, each..... 8.00
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One piece aluminum; immediate
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Latest styles fore-door, 5-pass., 30" to 34" wide, 32" to 90" long, nicely painted and upholstered.....50.00 to 100.00
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FORD FAN BELTS, WOVEN COTTON AND silk outlast six regular belts. Postpaid, 75c. Dealers, write. Angier's, Streator, Ill.

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Large sight seeing body for sale. Quick action necessary.
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when new; used one season and in perfect
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Model E Vulcanizer for casings and tubes
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112 W. B. Straight, each.....\$12.00
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straight, each..... 15.00
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W. B. 34 inches wide each..... 8.00
For assembling, each..... 4.00
Wheels—34x3½, 32x3½, per set—\$12.00-10.00
Axles—40-50 H. P. rear, each.... 50.00-60.00
Radiators, 30 H. P. honeycomb each... 15.00
Address Box D 169, care Motor Age.

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Standard Universal, quick detachable rims
in sizes 30x3, 34x3½, 32x4 at \$5.00 a set of
four, absolutely new. Also 30x3 one-piece
clincher rims at 50 cents each. Send for
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\$325.00 36 H. P. MOTORS, \$150.00.
4-cylinder, twin construction, aluminum
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A genuine English slip-on Auto Rain Coat. Guaranteed waterproof at \$6.00. You are buying direct from manufacturer. Send money order. Express prepaid. National Rubber Rain Coat Co., 310 E. State St., Rockford, Ill. b

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AN AUTOMOBILE ENGINEER AND PRODUCTION man of many years' experience, who can handle big propositions and get results, at present employed but wishes to change position. Address Box D 305, c/o Motor Age. c

A1 TIRE REPAIR MAN WITH GARAGE experience, will be open for engagement about April 15, 1913. I am an expert tire vulcanizer and a reliable automobile mechanic. Address Box D 274, c/o Motor Age. c

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Experienced man in the trade desires position on salary and commission basis. Box D 237, c/o Motor Age. f

CHAUFFEUR WISHES POSITION—SIX years' experience. Best of references. Total abstainer. Address Box D 286, c/o Motor Age. m

EXPERIENCED GAS-TRACTION ENGINEER and machinist wants position as gas-engine operator or as an auto-truck driver. Have worked in auto-repair shops and have driven some high powered cars and trucks. Am operating a 60 h. p. Hart Parr gas-tractor now on a big ranch. Furnish reference; married. Address Box D, 281, c/o Motor Age. y

HIGH GRADE SALESMAN, NOW EMPLOYED, who is also a mechanical engineer and possesses excellent business ability, desires position where he will not have to travel ALL the time. Have a wide acquaintance in the automobile and auto parts industry. Am 34 years old and very energetic. Address Box D 296, c/o Motor Age. k

MANAGER OR SUPERINTENDENT Mechanical engineer with splendid practical shop and commercial experience. Expert in the up-to-date manufacture of interchangeable machinery and parts. Resourceful in design and methods for reducing costs and increasing production. Good organizer and system man with excellent executive ability. Splendid record and references, at present engaged but for good reasons desire change. Address Box D 293, c/o Motor Age. s

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POSITION WANTED—IF YOU ARE LOOKING for some one to demonstrate or repair cars live where there are good roads and have steady work. Address Box 496, Abingdon, Illinois. b

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SITUATION WANTED—AS CHAUFFEUR either commercial or touring; best of references and married. Address Box D 297, c/o Motor Age.

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WANTED—A FIRST CLASS SALESMAN to take charge of the sales of gear plant. Product of proven merit. Opportunity also for investment. Good chance for the right party if competent. Address Box D 306, c/o Motor Age. c

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WANTED—GOOD, RESPONSIBLE SALESMEN to act as our exclusive representatives in States not now contracted, to sell our new invention for automobiles, the "Automatic Speeder and Primer." Gives 25 to 50% more mileage on gasoline consumed, and does it "automatically." One demonstration of this invention satisfies the most skeptical. Prefer men with car. Write: Automatic Device Co., Frankfort, Ind.

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Consult us; the people that know how to repair radiators, hoods, fenders, etc. Every repair goes out under our guarantee. We solicit a trial that will convince you that we are the leaders in this business.

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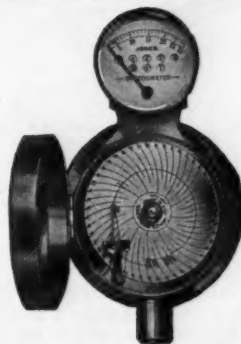
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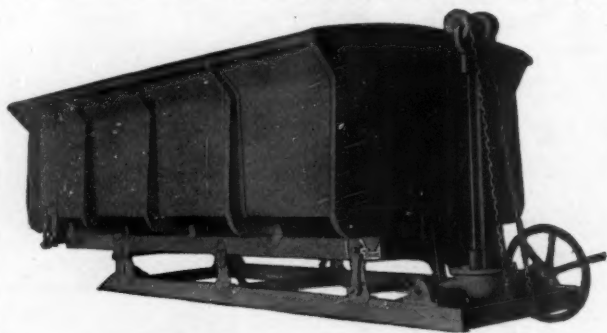
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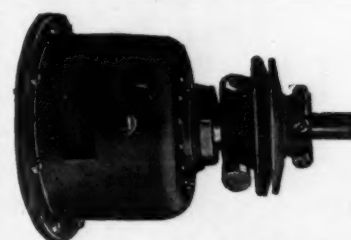
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No. 12

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"* * * When you decided to take up the Knight Motor, we heard the news with surprise. We wondered why you wanted to give up a car that was perfect, to our minds, to try something new.

"* * * Now we know why you changed; you have got all the power of your old style engine with all the noise eliminated. All roads are alike, whether they be hilly or level. The power of a gasoline car with the quietness of an electric car, combined with a wonderful flexibility and economy in gasoline, are all points that prove your ideas were sound."

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THE ULTIMATE CAR
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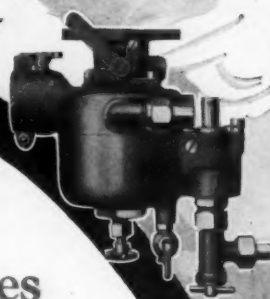
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FOREIGN BRANCH: Holley Bros. Co., Coventry, England

Marion

The Touring Roadster

A New Marion Model

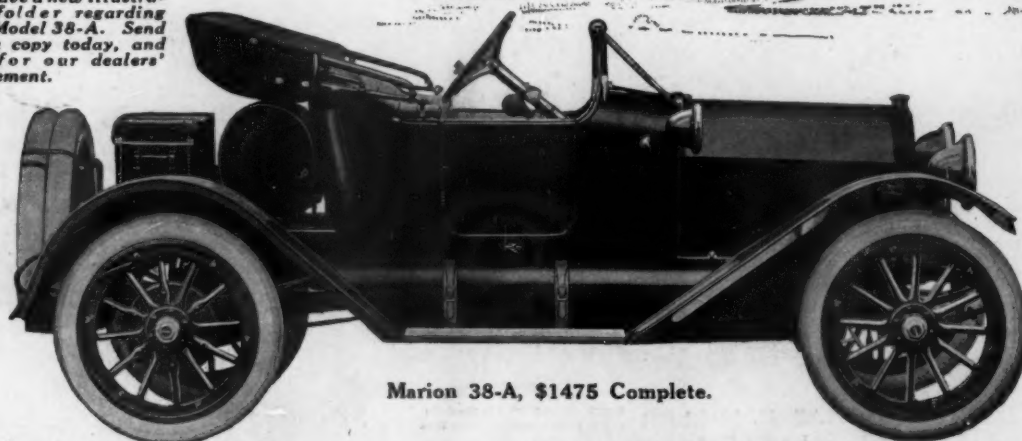
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Marion 38-A, \$1475 Complete.

The Marion Motor Car Company
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